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HEREDITARY TRANSFORMATION OF SYPHILIS *

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That syphilis may be transmitted to the offspring, as a strictly speaking heredity disease, is a fact known almost as long as our knowledge of that disease itself. Yet, the specific manner of transmission, the relative influence of the father and the mother, have for centuries furnished material for a great deal of discussion and dissension. And even to-day, aided by those two epoch-making discoveries of the probable microbic cause of lues—the spirochete pallida and the now well known serodiagnostic methods as introduced by Wassermann, Neisser and Brock and developed and modified by many others—we have by no means arrived at a perfectly transparent conception of all the questions involved.

Modern studies in heredity have helped us in many ways to approach the problem of the transmission of lues. Thus we have learned that while alcohol has a specific effect upon the nervous system the neuroses produced by it in a previously normal individual and appearing again in the offspring, are not in reality inherited, but are due to an intoxication of the germ cells through alcohol, or rather of the special organ-forming germinal district from which the central nervous system is formed. Also it has been shown as more than probable that inebriety in the mother is much more deleterious to the offspring than paternal alcoholism. The very important investigations of J. Loeb on natural and artificial parthenogenesis prove that in the first stage of evolution heredity proceeds solely from the ovum and here also he considers the egg-protoplasm as of paramount importance as against the nucleus. His studies point clearly to the fact that ovum and sperma are not equi-potential for heredity, but

* Part of a Symposium on Heredity, read before the Chicago Medical Society, May 4, 1910.

that the former determines the inheritance of species characteristics, while from the latter originates, in all probability, individual features. As applied to the question of syphilis we can by analogy conclude that in the process of hereditary transmission, the mother plays by far the more important part. And this is borne out by ample clinical observations.

The terms hereditary and congenital syphilis are often used erroneously as equivalent. The former alone should be reserved to designate transmission by heredity in the sense that from the first moment of protoplasmic differentiation, the ovum is under the influence of the specific poison of lues.

What is termed congenital syphilis may be the result of an infection of the fetus even several months after conception, through the recently infected pregnant mother, and would therefore more properly be called post-conceptional lues, or it may be due to an infection of the, until then, healthy fetus during birth; in other words, a form of acquired lues. That the latter two forms of transmission occur there is no doubt. Occasion for infection intra-partum is often enough present and by some it is claimed the common occurrence of specific coryza, the so-called snuffles, may be the result of the aspiration of infectious matter by the newborn.

As to post-conceptional lues, opinions differ in regard to the term of pregnancy during which transmission of the disease may take place, and this involves the question as to the rôle of the placenta as a supposed filter against the specific organisms of lues, or its toxins. Clinical observation offers abundant proof of the fact that a healthy woman, infected during pregnancy with syphilis, will transmit her disease to her offspring even as late as the seventh month of gestation. Infection of the mother after that period will usually be without influence upon the fetus. This seems to show that the placenta, at least during the last stages of pregnancy, may form a wall against the transmigration of specific organisms, and actual microscopic examination has shown that in such cases the fetal part of the placenta is indeed free from any signs of pathologic changes, nor does it contain any spirochetes, while the maternal portion may contain them. An explanation for the failure of the placenta to act under all circumstances as a filter may be found in the fact that under the influence of a highly virulent infection it will lose its normal constitution and its normal attachment.

In considering hereditary syphilis, properly defined, the part of the mother in its transmission is easily comprehended and supported by daily clinical experience. We know that the recency of the syphilitic infection is in direct proportion to the influence upon the fetus. A recently infected syphilitic woman, unless vigorously treated, will, as a rule, experience a series of miscarriages at an early period of her pregnancy; gradually the carrying power will improve until children are born at term, either dead or with little chance for life; eventually, as the virulence of the disease subsides, living children may result with a gradually increasing capacity for survival.

Under the influence of proper treatment of the mother the chances of the offspring are enormously improved. Variations in the character of the several births depend, besides the influence of the treatment, upon the relative activity of latency of the disease.

In estimating the influence of the syphilitic father upon the offspring we are at once confronted with a mass of conflicting evidence and an almost hopeless schism of opinion. In former times the theory of the transmission of syphilis from the father to his children was accepted practically without discussion. Also it was held that such transmission was possible without the infection of the mother, and furthermore it was taught as practically a fixed law, that the mother of such a paternally syphilitic child could not be infected through nursing her own child; could not even be infected with syphilis from an outside source; in fact, that she had acquired immunity against lues. This, briefly, is the substance of the so-called law of Colles or Beaumès, as promulgated almost eighty years ago. Gradually doubts arose as to the proper interpretation of this apparently incontrovertible law. Observations were numerous, when such apparently healthy mothers showed gradually accentuating signs of cachexia; loss of hair, glandular swellings and irregular cutaneous lesions. Such cases were explained by a so-called *choc en retour,* a modified infection of the mother through her own fetus.

The first who had the revolutionary courage to vigorously oppose the long accepted theory of paternal transmission was Metzenauer, who in 1903, before the Vienna Medical Society, presented a powerful argument against it and proclaimed the mother as the only party responsible for the heredity syphilis of the child; i. e., that she, being first infected by her own husband, transmitted the disease by way of the placenta to her offspring. Almost alone in his stand, there were arrayed against him such clinicians as Neumann, Finger, Zeissl, Ehrmann, Lang, Kassowitz, Hochsinger and others, who in a memorable discussion extending almost over six successive sessions, brought into play a wealth of clinical experience which it is difficult to ignore. Metzenauer, however, upon purely clinical and anatomical considerations, anticipated by several years what has since been made much more plausible through the aid of the Wassermann test.

His chief points were: "We know of no infectious disease which is inherited from the father. The sperma of a syphilitic man is in itself not infectious. It is difficult to see why the child alone should be infected and why the mother should escape. Even in so-called paternal transmission the placenta shows characteristic pathologic alterations. The apparent freedom of the mother may be due to insufficient examination or the overlooking of early manifestations. The fact that 20 to 38 per cent. of all mothers of syphilitic children are supposedly well, while on the other hand 38 to 40 per cent. of tertiary forms in such mothers occur without any known preceding symptoms of lues, may be explained upon the same basis. There is no such thing as the inheritance of permanent immunity against lues. The immunity of an apparently healthy mother

of a syphilitic child indicates that she has latent syphilis, which is the true interpretation of Colles' law."

Some of the chief objections to these conclusions were brought out by Neumann as the result of years of observation. "That lues may be inherited from the father alone is proven by the often observed fact that healthy women, impregnated by their syphilitic husbands and giving birth to syphilitic children, remain well both during pregnancy as also permanently afterwards. This is further proven by some cases where such women during their pregnancy were infected by other men. This would be in distinct contrast to the assumption that such a mother is already syphilitic. Further, the fact that a woman, who from a syphilitic man had born a syphilitic child, afterward had two healthy children successively from another healthy man, and then again from the former syphilitic man a syphilitic child. Further, the fact that a mother having given birth to a syphilitic child may in the future produce healthy ones after the antisyphilis treatment of the husband *alone*."

The seven years since this highly interesting debate have been filled with such a stupendous amount of scientific investigations on the etiology and serodiagnosis of syphilis that it has become almost impossible to faithfully follow the respective literature. Some problems have certainly been brought nearer their solution, none having been entirely elucidated. The fact that the syphilitic fetus shows an abundance of spirochetes is interesting in itself, but proves nothing conclusively as to their prominence. That they are so much more numerous here than in the tissues of the mother does not necessarily prove that they have first found lodgment in the fetus and then have reached the mother, but shows probably that the embryonic structures offer a better field for propagation. The fact that often the fetal portion of the placenta shows their presence while the maternal part is more or less free from them has been construed as evidence of paternal infection. *A priori*, however, it does not seem very plausible that fructification of the ovum could take place by a spermatozoon encumbered by a comparatively large organism, and if such could really happen, that development of the germs cell should proceed in the presence and under the influence of a highly virulent microbe. Those who even to-day proclaim the possibility of paternal infection, and among them is as weighty an author as Bab, believe that the spirochetes are not directly carried to the ovum by the spermatozoon but that infection takes place in the uterine cavity by the organism which is carried along with the sperma, after the ovum has been fructified. Whether we accept this theoretical explanation of the paternal influence or not, we cannot get away from hard clinical facts as mentioned before and coming from such experienced and reliable observers as Neumann, Finger, and others.

I may be permitted to add from a large number of personal experiences one case, which seems to me instructive. A man whose syphilitic career I had followed for almost sixteen years married a healthy, vigorous woman about three years after his infection, and at a period when he was free from any demonstrable symptoms of his disease. Two children were born from this union free from any conspicuous signs at birth and remaining so, but distinctly retarded in their physical and mental development, and showing, if the expression may

be allowed, a marked hereditary taint. After six years of married life the mother became infected by her own husband, who, a habitual smoker, developed from time to time numerous patches on the tongue. A full fledged generalized papular syphilide proved this to be a fresh infection. This case would show the influence of the latent syphilis of the father in the production of children that were in spite of their robust mother decidely under par; it also shows that these children did not secure for their mother any immunity against later infection.

The so-called Wassermann test has in the last five years been put to considerable service in the study of all the problems of hereditary syphilis, and many interesting facts have been brought out as to the meaning of the laws of Colles and Profeta. The latter, which has long since been found erroneous, professed that children born apparently healthy from a syphilitic mother are immune against luetic infection.

Knöpfelmacher and Schudorf, Bab, Bauer and many others tested the validity of these so-called laws by the modern serodiagnostic methods and found them to give a positive reaction in 78 per cent. of all the apparently healthy mothers of syphilitic children examined, even several years after their birth. They concluded from this, that these mothers are not in reality immune but have latent syphilis. In a similar way, children of syphilitic mothers, born apparently healthy, give a positive Wassermann reaction. Rietschel, in a similar investigation, found the test to be positive in almost 100 per cent. of the syphilitic mothers. In children born with distinct signs of heredity lues the test gives invariably a positive reaction.

Bauer, however, found the test often unsuccessful in unborn children, due, as he believed, to certain peculiarities of the infantile serum. He also denies the validity of Profeta's law and considers such children as having latent syphilis. In regard to Colles' law he points out, that mothers of syphilitic children in apparent good health, in spite of the positive Wassermann, rarely present symptoms requiring specific treatment and hardly ever develop para-syphilitic nervous disorders.

He also tested heredity syphilis at later periods and got, as a rule, a positive reaction, just as in the tertiary syphilis. A similar observation has been made by Bering, who believes that the substances, whatever they are, which seem to cause the Wassermann reaction, persist much more tenaciously in hereditary than in acquired syphilis.

However interesting all these findings may be they do not finally solve the problem as to Colles' law; i. e., whether the mother is immune or has latent syphilis. For it still appears plausible that the syphilitic fetus may furnish the mother syphilitic antibodies, without infecting her. In regard to this purely theoretic assumption we may mention the investigations of Baisch, who found that the hemolysis-inhibiting substances do not pass through the placenta, for in some cases there may be a positive Wassermann reaction in the mother while the fetus gives a negative one, and in other cases this again reversed. Baisch considers that these peculiar substances can originate only as the result of the presence of spirochetes and that therefore the apparent immunity of the mother of a syphilitic child means a true infection with syphilis. On the subject of immunity against syphilis we may here refer, by the way, to the conclusion arrived at by

Neisser, and also by Citrou, who from animal experimentation upon monkeys, deny the possibility of immunity in syphilis and consequently have given up the hope of eventually finding an antisyphilitic serum. One is reminded in this connection of a famous saying of Fournier: "The only way to acquire immunity against syphilis is to have had the disease itself." To show the inferior rôle of the man in hereditary lues Bab mentions the following case of Porak: A woman, after having been married three years to a syphilitic man, married then a healthy man, and during the following fifteen years gets eleven syphilitic children, some of which are aborted. Also Engelman reports the case of a woman who first was married to a syphilitic man and had from him, in succession, three dead, prematurely born children. She later married a healthy man, and although remaining in apparently good health, she became pregnant and gave birth to a child with manifest symptoms of lues. The Wassermann test shows a positive reaction in both mother and child. In spite of all this the husband remains well and the Wassermann in his case remains negative.

However, to deny any and all influence of the syphilitic father directly upon the offspring seems to me to go too far. To mention only one disease in which the direct spermatic transmission to the fetus is to-day practically admitted, we may refer to leprosy. We know certain skin diseases, which are often inherited from the father alone; i. e., ichthyosis, psoriasis, dermatolysis bullosa, not to speak of the inheritance of many peculiarities both mental and physical, which are thus transmitted. In these cases the spermatozoon is the sole carrier of hereditary transmission. It does not require an unnatural stretch of imagination to believe, on general principles, in the possibility of spermatic transmission of lues. The standpoint of those who deny any paternal influence in the transmission of lues is moreover, as far as our practice is concerned, unsafe. They would insist merely upon antisyphilitic treatment of the mother. The careful practitioner, however, will equally insist upon proper treatment of the father, especially if he should give a positive Wassermann test.

When both father and mother are subjects of active syphilis at the time of conception their respective share in the transmission of the disease is not easily determined. But we know that in such cases the outlook for the offspring is of the worst. After energetic treatment of both, I have, however, in many instances seen children to be born with excellent chances for growing up.

The question of the transmission of lues by heredity to the third generation has not received a final answer. The majority of syphilographers deny such a possibility. Some, like Gaucher, believe that syphilis in the third generation is represented by a number of pathologic disorders which he tried to group together under the term of quaternary syphilis. Among them adenoids and even appendicitis. These ideas are too fanciful to merit earnest consideration.

In regard to the fate of the congenital syphilitic children I believe that their chances have much improved with better methods of treatment. I have advisedly here used the term congenital, meaning by this

children which are born alive with manifest symptoms, either at birth or soon after. Their response to proper treatment, mainly by mercurials, is very marked and I could point to dozens of them from my own practice who have grown up in a perfectly normal way, both physical and mental. Unfortunately, many fathers conceal from their physician the fact of a former infection, and thus their children are often deprived of that circumspective care and timely treatment which they may need. I remember such an instance of a man with latent syphilis, who against my advice married less than three years after his infection. A child was born a year later; the mother had a mastitis, as I learned accidentally. I was never given a chance to see the child; this would have aroused suspicion in her family. When the child was two years old the parents discovered that she was deaf. The grief of the father, who only then came to me for advice, can better be imagined than described.

As far as the question of nursing of syphilitic infants is concerned the old maxim that such children should be nursed by their own mothers has received still better foundation by recent investigations. The apparently well mother, the so-called "Colles mother" has in her milk the same antibodies as in her blood and can thus be of great service to her child in a therapeutic way. In a similar manner the apparently healthy infant of a syphilitic mother will rarely be infected by its mother and can safely be nursed by her.

In regard to the so-called late heredity syphilis opinions are divided. I personally believe that there are often cases where the first conspicuous symptoms of heredity lues, usually of the tertiary type, may occur years after birth. Others deny such a possibility and explain them as relapses of an ignored early infection.

In conclusion, I may express it as my belief that the subject of heredity syphilis will for a long time yet furnish abundant occasion for study, experimentation, observation and speculation.

PERSISTENT INFECTIONS IN SPECIFIC URETHRITIS IN RELATION TO THE PENILE URETHRA *

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One author[1] has aptly styled the penis "the most versatile member of the human anatomy in its variations from the regular type." These variations occur irrespectively of the individual, as the small poorly developed man may be extremely well developed sexually, while his stalwart athletic brother may be just the opposite. From the double penis, as reported by Velpeau[2] and by Küttner,[3] to the complete absence

* Read at the Sixtieth Annual Meeting of the Illinois State Medical Society, held at Danville, May 17-19, 1910.

1. Med. Rec. N. Y., 1909, lxxv, 49 and 54.
2. Journal des Connaissances Medico-Chirurgicales, xiv, 39.
3. Beitr. f. Klin. Chirur. Bd., xv, H. 2. Cited after Carl Beck. Med News, Sept. 21, 1901.

of the organ, as reported by Harris,[4] we may have many degrees of abnormalities which cause no harm and may go unnoticed for years unless the penis becomes affected by disease and the anomaly is then discovered by the genito-urinary surgeon.

Persistent infections in course of specific urethritis occurring in the penile urethra may be either localized in the urethra or localized in some remote part. Those that occur in the urethra are secondary to congenital malformations or secondary to localized infections (paraurethral abscess); those that occur in remote parts are due to absorption of the gonococci before the body has had time to produce sufficient antibodies to protect itself against the invading organism.

A. *Congenital malformations may be:* 1. In the prepuce. 2. In the glans penis. 3. In the shaft of the penis.

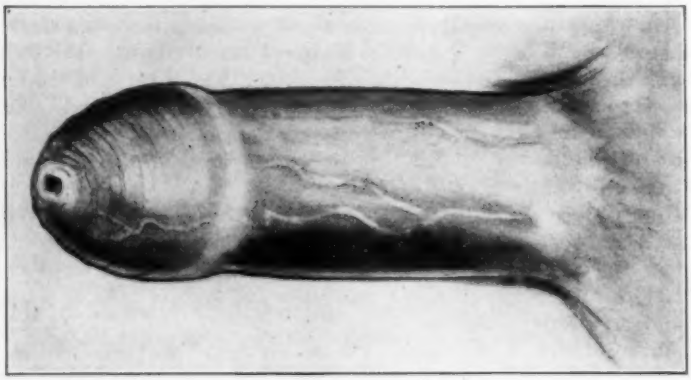

Figure 1.

Figure 1 illustrates the type of infection in which the opening in the prepuce may vary in size from that of a pin point to that of a normal aperture but unless it is a hindrance to drainage and treatment it should be left alone during the infectious disease.

I wish to report a case that had a complete phymosis with an opening in the prepuce about ⅛ inch in diameter. The patient was not able to urinate or ejaculate without first filling the distended preputial sack, and then by squeezing the sack, its contents could be emptied through the small opening. This patient had contracted a specific urethritis and it was absolutely impossible to treat him without a preliminary circumcision.

In taking up the subject of congenital malformations of the glans I have considered the external urethral orifice first. Speaking from a pathologic standpoint all infections have their origin at the exterior urethral orifice, and this then is the most important part involved and as a consequence should be the first considered. The external urethral

4. Phil. Med. Jour., Jan. 8, 1898.

orifice varies from a pin point opening situated either near the superior or inferior surface of the glans to the large gaping opening of the hypospadiac, situated at the junction of the glans with the body of the penis.

The size of the external urethral orifice is extremely variable; most observers consider a meatus capable of admitting a 24 to 28 Ch. Ben. bougie to be normal; meati smaller than this, however, are very common and as far as their functions during health go are perfectly satisfactory, but as soon as the urethra becomes infected with the gonococcus we have our small opening acting as a stopper to the urethral canal. Many observers have shown the relationship between a posterior urethritis with its complications and a small external urethral orifice and it seems perfectly proper to believe that these conditions should go hand in hand and whenever there is such a congenital abnormality we are perfectly justified in making a meatotomy notwithstanding the presence of a specific urethritis.

Very often the superior and inferior commissures of the urethral orifice form a thin lamella, like an actual membrane uniting the lips of the meatus, either above or below. Among 500 genito-urinary patients in the clinic of the hospital Necker,[5] in Paris, a meatus membranosus in the lower portion was found in 140. In eighteen it was superior, and in twelve it was both superior and inferior.

By far the most important congenital malformations in respect to persistency of infections are the accessory openings of congenital canals that occur on either side of the external urethral orifice or elsewhere on the glans penis. LeFort[6] has presented an elaborate classification of these conditions, describing in minutiæ all the different congenital openings that could possibly exist, but as far as practicability is concerned the classification as outlined by Jadassohn[7] is far more comprehensive and is as follows:

1. Preputial canals opening on the prepuce at either side of the frenulum; these may be displaced Tyson's glands or crypts, i. e., gland-like invaginations of the epidermis.

2. Minute canals opening close to the meatus, or on the mucus membrane just within the urethra; these may be abnormal or displaced openings of some of Littrés' glands.

3. Canals on the under surface of the penis, near or crossing the median raphe.

4. Canals relatively large on the dorsal surface between the two corpora cavernosa; these may go from the sulcus coronarius to the symphysis.

Of the first classification: Displaced Tyson's glands are the most common; these as a rule occur on either side of the frenulum close under the median raphe and from their appearance and hardness may be mistaken for primary lesions that have not yet eroded, but careful observation will show the minute orifices plugged with a drop of pus, and by palpation their base can be felt to be continuous with the urethra; not

5. Ann. des. mal. des. org. gen.-urin., 1897, 380.
6. Ibid., 1896, 624.
7. Deutsch. Med. Wchnschr., 1890, Nos. 25 and 26, 542.

infrequently we have these glands extending into the urethra or the urethral glands suppurating and pointing externally at this site. As these conditions are quite common we should always make a careful observation of the urethra with the urethroscope before making a diagnosis.

Of the second classification: Figure 2. Minute canals that open on either side of the meatus or on the mucous membrane just within the urethra are the most frequent and persistent and least responsive to treatment of all the congenital malformations we have to deal with.

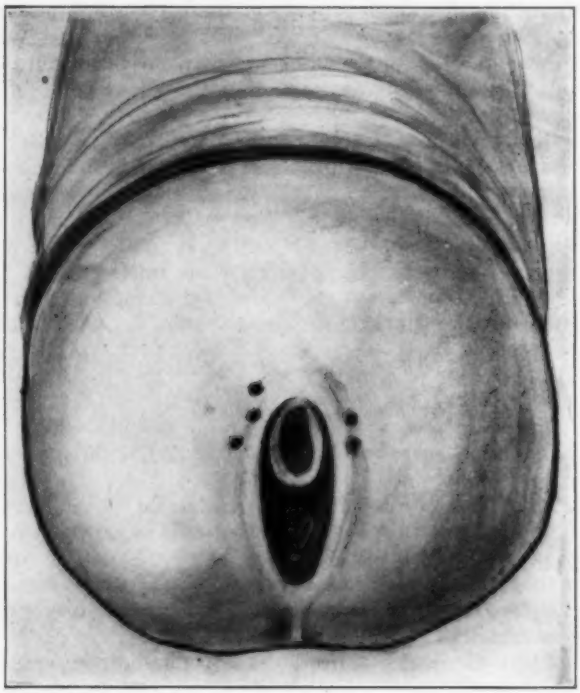

Figure 2.

Often an infected gland emptying itself just within the external urethral orifice will cause the continuance of an infection for months.

Of the third classification: Canals on the under surface of the penis near or crossing the median raphe. This form of congenital malformation is comparatively rare. Figure 3 illustrates a case of a young man aged 20 years that occurred in my practice. He had contracted a specific urethritis and presented himself for treatment on account of the peculiar situation of his infection. Besides pus exuding from the external urethral orifice, directly back and beneath the external orifice, at the junction of the frenulum with the glans penis there was an opening that

connected with a canal which extended down the median raphe and ended in a blind sack in the middle of the scrotum. This canal was lined with mucous membrane and in order to destroy our infecting organism here it was necessary to slit the canal along its entirety and to apply 10 per cent. nitrate of silver several times.

Of the fourth classification: Canals relatively large, on the dorsal surface, between the two corpora cavernosa. These may go from the

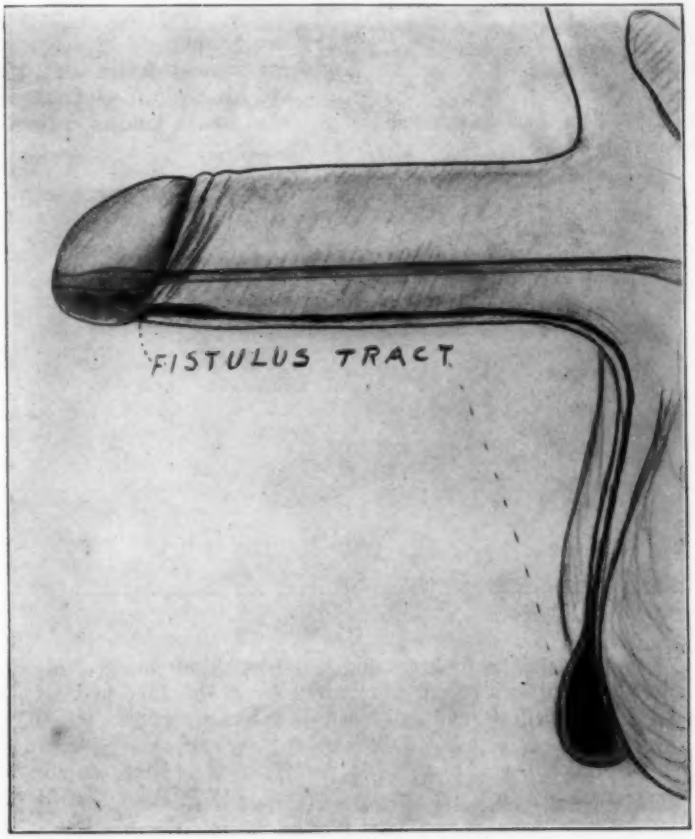

Figure 3.

sulcus coronarius to the symphysis; these are also extremely rare. Rosenthal[8] reports the case of a student, whose urethral opening showed two equal orifices, one above the other, the lower one being the urethral one. The two canals were divided by a septum and there was a third minute opening from which secretion could be expressed.

8. Arch. f. Derm. and Syph., 1893, No. 4, 744.

Except for the blind openings that occur in the median line and anterior to a hypospadias this practically concludes the infections that occur in conjunction with congenital malformations.

There is no doubt that many different kinds of congenital canals exist but these patients do not come under medical observations until a purulent discharge manifests itself, and as a consequence are never discovered. The literature contains numerous references to these conditions but they are of sufficient rarity to be of no practical value. It is sufficient for us to bear in mind that the most persistent and intractable cases of specific urethritis are those that are complicated by congenital malformations, for here we have conditions to meet that are at times most discouraging, both for the patient and his medical advisor. The treatment here must be selected and governed by the kind of deformity existing.

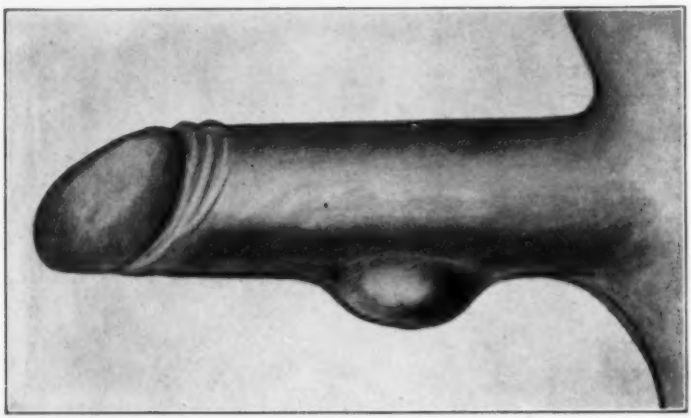

Figure 4.

When a canal is easily accessible it is possible to cure the infection by silver salts but as a rule the prolonged use of this kind of treatment has no beneficial effects, and excising the canal as a rule only adds insult to injury, as the protecting wall which has been formed is cut away and the infection is simply permitted to travel that much deeper.

Cauterization with lunar caustic or nitric acid at times destroys the mucous membrane and puts an end to the infection but the best method of disposing of these canals is with the actual cautery. This is best put into the canal cold and then rapidly heated to a cherry red.

B. *Persistent infections secondary to localized infections* (Paraurethral abscess).

R. Picker,[9] in his investigations concerning the pathology of gonorrhea, claims that this infection is greatly aided mechanically by friction during coitus, when the gonococci are rubbed into the epithelia of the

9. Ztschr. f. Urol., 1909 1, Beiheft, 120.

open urethral os, claiming that it depends upon the impetus coeundi whether the bacteria are deposited upon the epithelial or into the deeper epithelial layers. If the germs are sufficiently virulent and numerous and the soil is virgin, the infectious disease will break out rapidly. As the glands of Littré and lacuna magna all point toward the external urethral orifice in the anterior urethra it is hard to conceive of a specific urethritis existing without some involvement of these structures taking place. The most common site of infection is the lacuna magna but it is not uncommon to find localized infections anywhere along the pendulous urethra. This is substantiated from the condition of the urethra in a chronic anterior urethritis for here with a sound in place, the floor of the urethra at times feels like a veritable washboard.

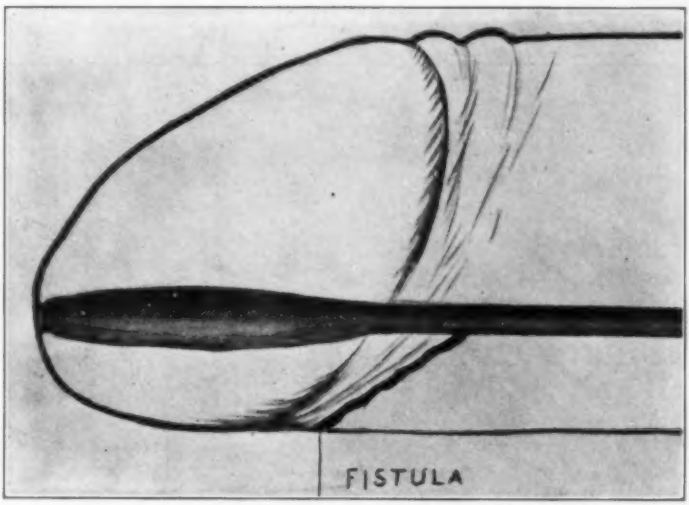

Figure 5.

The course of a paraurethral gonorrheal infection corresponds with that of the urethral infection; acute stage, swelling, secretion and tenderness followed by a chronic stage. The secretion is at first thick and creamy, later muco-purulent but containing gonococci during the whole time. Figure 4 serves to illustrate a typical paraurethral abscess occurring in the shaft of the penis. With a history of an infection and the finding of the gonococci these conditions in the anterior urethra are not difficult to diagnose. A paraurethral gonorrhea aggravates the prognosis of a urethral gonorrhea, because the urethra may be constantly reinfected from the near-by focus and even if the urethritis is healed, infection may be transmitted from the paraurethral foci and spontaneous healing is doubtful. The fistulous tracts resulting from paraurethral abscesses form some of the most persistent infections that we have to deal with in

genito-urinary practice. These cases may go on for years, the patients believing that each recurrence is a new attack.

I wish to report four cases in which the infections occurred either in the lacuna magna or in Littrés' glands just back of the glans penis.

CASE 1.—Fig. 5. Mr. H., aged 36 years, gave a history of many attacks of gonorrhea, and six years ago an acute swelling just back of the glans penis; this ruptured with resulting fistula, which had continued to discharge pus containing gonococci and had reinfected the patient during all of these years. With a sound in place the fistulous tract was delicately dissected out including a small piece of the mucous membrane; the external wound being closed with pursestring sutture this fistulous tract recurred so that there was a little escape of urine during urination but the infection was eradicated.

CASE 2.—Mr. B., aged 35 years. Last attack of specific urethritis seven or eight years ago, with many recurrences. Operated on the same way, only great care was taken not to injure the mucous membrane; this wound healed completely with resulting cessation of the infection.

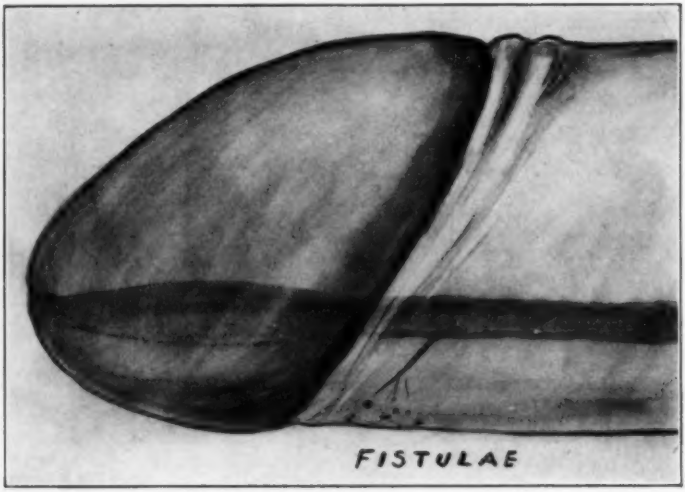

Figure 6.

CASE 3.—Mr. G., aged 36 years. Last specific infection five years ago, has had repeated attacks since. Fig. 6 illustrates the condition. The patient had a swelling first beneath the glans pointing in the sulcus coronarius on either side of the frenulum; this opened in several places, which later united and formed a single fistula which connected with the urethra. This was dissected out following the same precaution concerning the urethral mucosa; there was perfect union with a complete disappearance of the discharge.

CASE 4.—Fig. 7 serves to illustrate an infection of a young man aged 19 years that occurred in my practice with a persistent anterior urethritis for eighteen months. This was his first infection and its persistency had been a source of great annoyance. Examination showed a normal penis that had been circumcised in childhood. Just back of the glans penis to the left of the frenulum under the subcutaneous tissue of the corona and continuous with the urethra a small hard gland about the size of a pea could be felt. On hard pressure pus

exuded at the opening ½ inch anterior at the external urethral orifice, the gland was incised, and considerable pus evacuated; later it was possible to pass a silkworm gut suture from the external opening through the canal and out the incised opening.

An acute paraurethral abscess that occurs anywhere along the penile urethra should be incised externally when it has pointed sufficiently; operation through the urethroscope is permissible in skilled hands but here an incision too deep or too long may serve only to disseminate the infection. For the chronic infected glandular cases either massage over a sound, electrolysis or the actual cautery offer the best means of disposing of the infection.

C. Infections Localized in Some Remote Part.—If a considerable number of highly virulent gonococci are carried away in the circulation they may lead when deposited to suppuration, and if the point of reaction is

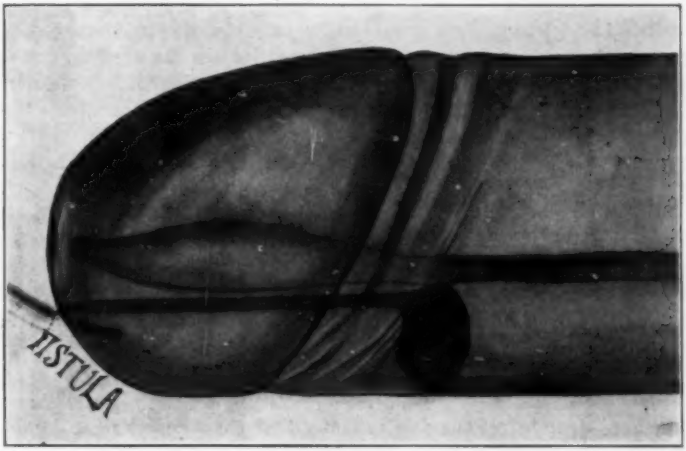

Figure 7.

in the bones an acute purulent osteomyelitis, periostitis or arthritis may develop. Picker[10] cites cases in which gonorrheal infection led during the period of incubation to systemic symptoms, fever and pains in the joints. Similar cases have been reported by Ahmann,[11] Hausteen[12] and Scholtz.[13]

An interesting case of this kind occurred in my practice. A salesman, aged 26 years, who in the first week of a specific anterior urethritis had an acute gonorrheal infection of the tendo Achillis bursa, in which I was able to find gonoccocci. This case serves to illustrate the condition of a tardy antibody-formation and a virulent infection.

10. Ibid.
11. Arch. f. Dermat., xxxix, 1897.
12. Ibid., xxxviii, 1897.
13. Ibid., xlix, 1899. Cited after R. Picker (ref. 9).

Systemic infection following acute anterior urethritis is more common than infection following a chronic localized focus, for in the latter the body has had sufficient time to produce numerous antibodies which protect the system, but general systemic invasion is more often associated with posterior urethritis.

TREATMENT.

For the treatment of acute anterior infections of the urethra energetic measures begun as soon as a diagnosis is made seem to offer the best prophylaxis against persistent localized infections. However, when there is an abnormality present our aim should be to destroy the infection without unduly injuring the basement membrane. Each case will offer perhaps a different phase and will have to be treated accordingly. The use of anti-gonococcus serums or vaccines for the treatment of persistent infections up to the present writing have been of comparatively little value. This seems to be borne out clinically by the reports of different clinicians, all claiming its good results in systemic infections but disclaiming any beneficial results in local conditions in the urethra.

At the present I am treating some persistent general infections of the anterior urethra with the *Bacillus bulgaris* and lactic acid bacillus. What the ultimate outcome will be I am at present not able to state, but I am satisfied that we have not as yet reached the ideal method of handling acute infections of the urethra.

With the pessimistic expressions in the journals of the lay press concerning the persistency of gonorrheal infections one would imagine that a man once infected with gonorrhea was a bacillus carrier for life, and as such a dangerous character to the community. We all know that such ideas are erroneous and that with intelligent management such infections are amenable to treatment.

CONCLUSIONS.

1. Persistent infections due to congenital abnormalities are common pathologic conditions in genito-urinary surgery.

2. Specific urethritis secondary to congenital malformations and localized infections (paraurethral abscess) form some of the most stubborn and persistent types of infections.

3. Careful examinations by means of the modern methods now at our disposal will often reveal their presence.

4. Early treatment, based upon the pathology of the condition offers the best method of eradicating the infection.

100 State Street.

DISCUSSION.

Dr. C. B. Horrell, Galesburg:—I do not rise to discuss this paper, but simply to ask a question which I hope the essayist will answer in his closing remarks. I would like to hear from the essayist as to the results that have been obtained from the use of the serum treatment in gonorrheal rheumatism.

Dr. L. B. Russel, Hoopeston:—There are one or two points which, it seems to me, should be brought up in the treatment of gonorrheal urethritis. In the first place, every case should be taken and treated early, if possible. A great

many men have the habit in our town of going to the drug store first, and when the druggist has treated them for a few days or a few weeks, these cases of gonorrheal urethritis are hard to cure, but if we can get them early, I believe with Casper that one of the best agents to start with is thallein sulphate, followed with silver nitrate.

There is one point about the use of the sound which I regard of importance, namely, when the sound is used we should leave it in for some time. A great many of the books do not mention this, but it is important. I have found out that my cases get along much better when I insert the sound and leave it in for ten or fifteen minutes.

Dr. B. D. Baird, Galesburg:—I think this is too valuable a paper, and the disease occurs too frequently in our practice, to let it go without further discussion. It seems to me, if we are going to cure gonorrhea, we must begin to cure it right away, get at it early, and keep it up. I am almost constrained to say that gonorrhea, if neglected beyond a certain point, should almost be classified with the incurable diseases.

Dr. Corbus spoke of the gonorrheal patient being a carrier of bacteria. I think there is a good deal of truth in that statement. The gonococcus has been demonstrated in the urine in one of my cases seven years after the infection. Personally, I have seen a few patients die from gonorrhea, and gonorrhea is *not* simply "a bad cold." It may be considered so when a young man has not attained his majority, but those patients who contracted the disease in their early days and neglected its treatment are the men who are suffering today. The fellows that contracted the disease twenty years ago, when they were young men, are the ones who are having their prostates taken out today. This campaign against gonorrhea should be carried on very vigorously, and it does not make so much difference what line of treatment we pursue just so long as we cure the disease by getting at it early.

Dr. J. G. Fisher, Danville:—I wish to report one rather unusual case that came under my care last year. This man had had several attacks of specific urethritis, and in July he went fishing and developed a number of chills. I thought they were malarial in character and treated him for malaria, but treatment did not seem to do him any good. Quinin was of no value. Finally I examined his urine and found no albumin or anything which would point to any infection or kidney trouble, but putting it under the microscope I found a bacillus which resembled the colon bacillus. No cultural tests were made, but according to the appearance and quantity and the manner of conducting itself, it seemed to be an infection with the colon bacillus. Under urotropin the condition somewhat cleared up, but I found this bacillus over quite a period of time. Finally his urethritis cleared up, but once in a while he has a recurrent attack owing to infection of one of the glands in the free prostatic urethra; otherwise he seems to be in good health. I have not examined him for the colon bacillus recently, but I would not be surprised to find it during one of these attacks.

Dr. B. C. Corbus, Chicago (closing the discussion):—In answer to Dr. Horrell's question in regard to the value of antigonococcic serum and vaccines, the general consensus of opinion seems to be at the present time that they are valuable in systemic infections alone, not in local conditions, but notwithstanding this, if you have a localized infection in the urethra, such as an infection of the prostate, that prostate will need mechanical treatment, massage, etc.

In regard to the local treatment of a specific urethritis, I believe genitourinary surgeons agree that treatment in these cases should be instituted early. With reference to the criticism about a patient having carried the gonococcus for seven years, I did not wish to convey the idea that these patients once infected were always infected. I said that they would be "bacillus carriers" if something was not done for them.

THE TECHNIC AND VALUE OF THE WASSERMANN TEST IN THE DIAGNOISIS AND TREATMENT OF SYPHILIS*

W. T. Mefford, M.D.
CHICAGO

In the short time allowed I shall not consume your time by a rehash of the history of the Wassermann test or the theory of uniting materials in the test tubes or the preparation of materials, farther than the preparing of such ingredients as required at the time of making a test. The subject is so broad and important that one can only touch upon a few points in a paper of this kind.

The Wassermann test is a seroreaction test for syphilis. In Europe the men to whom you should give the most credit for work along this line are Wassermann, Lesser, Bordet, Bruck, Citron, Ehrlich, Fleischmann, Gengou, Levaditi, Marie, Morgenroth, Neisser, Nonne, Porges and Tschernogubow, etc. In this country Butler stands pre-eminently at the head. Long, of Birmingham, Ala.; Kaplan and Sach, of New York, and Levison, of Toledo, Ohio; Matson, of Portland, Ore., and Letterer, of Nashville, Tenn. I know of no one's observations that would be so instructive as to the great value of the Wassermann test as those of Lesser. Lesser, in his post-mortem studies of visceral syphilis, saw thirty cases of liver gumma that had not been recognized or diagnosticated clinically. In twenty-two cases no clinical symptoms pointing to them had occurred. In eight cases of liver cirrhosis their syphilitic character had not been recognized. In nineteen cases gumma of the lungs often combined with tuberculosis had not been recognized. Three cases of gumma of the heart, two of suprarenals had not been diagnosticated clinically. Lesser's farther post-mortem examinations show that in Berlin in about nine per cent. of all men over twenty-five years syphilis is anatomically observable. Certainly these observations are instructive enough to the clinician or general practitioner of the need of carefully eliminating syphilis as an associate or accessory in visceral and other diseases.

Butler and myself, to establish the value of the Wassermann test, made examinations of patients with all diseases usually found in Cook County Hospital, and such other diseases as we could find outside not examined in the hospital. We examined these patients in all stages and at different periods of disease and long after complete recovery. By these repeated examinations we found that in cases in which the seroreaction was positive at first examination it was still positive at our later examinations long after complete recovery from the acute disease. In most of these positive cases we got a syphilitic history. These facts show that the positive reaction was due to the previously acquired syphilis and not to the acute disease. We found it present in practically all those conditions the etiologic factor of which is now known to be syphilis, namely, general paresis, tabes, etc. In different chronic diseases, tuberculosis, etc., we occasionally got a positive Wassermann, not that tuberculosis gives the

* Read at the Sixtieth Annual Meeting of the Illinois State Medical Society, May 18, 1910.

seroreaction but that syphilis is occasionally found to be present and active at the same time. This applies to other chronic disease. Where we got a positive Wassermann we most generally in these diseases got a typhoid history. We got a positive seroreaction in all stages of known active syphilis, such as primary lesions, when first observed, secondary, tertiary, para-syphilitic and inherited.

The materials necessary for the Wassermann test, are luetic liver extract, amboceptor or sheep immunized rabbit serum, guinea-pig serum or complement, washed sheep corpuscles, specific and normal serum and sera to be tested. The materials for this test are now prepared and standardized, full instructions going with them how to mix and read results. Mixing of materials is an easy matter, any one being able to do this. The preparation of material, however, is not a complicated affair. The literature on mixing material usually gives measurements in c.c. or parts of c.c.

I think the drop method most convenient and sufficiently correct. I believe that an audience of this kind will get more information about the test, to describe by drops. To mix material I use one-half inch by four-inch test tubes. It is best for beginners to prepare a chart.

CHART FOR MIXING MATERIALS IN WASSERMANN SEROREACTION TEST

Names of persons whose sera are to be tested and controls.	Number of tubes.	10 drops physiologic salt solution.	One drop luetic liver extract.	One drop serum.	One drop of complement.	Incubate Thirty Minutes	One drop amboceptor.	One drop washed sheep corpuscles.	Note results
Serum to be tested goes in Tubes 1 and 2.....	1	1	1	1	1		1	1	.....
	2	1	0	1	1		1	1	.....
Known positive or specific serum goes in Tubes 3 and 4.	3	1	1	1	1		1	1	.....
	4	1	0	1	1		1	1	.....
Known normal or negative serum goes in Tubes 5 and 6.	5	1	1	1	1		1	1	.....
	6	1	0	1	1		1	1	.....
Control on all tubes.....	7	1	0	0	1		1	1	.....
Control on complement in amboceptor	8	1	0	0	0		1	1	.....

TO SET UP TEST

First, number tubes. Second, put in 10 drops physiologic salt solution, using an ordinary dropper. Third, one drop luetic liver extract. Fourth, one drop of serum in such tubes as indicated under names at left of chart. Fifth, add one drop of complement or guinea-pig serum. Incubate 30 minutes. Sixth, add one drop of amboceptor. Seventh, add one drop washed sheep corpuscles, either two parts of corpuscles and three parts physiologic salt solution or one part corpuscles and one part physiologic salt solution. Again return to incubator for ten to thirty minutes; usually test has worked in this time. Shake tubes as materials are added.

Materials at head of column go in such tubes as marked (1) in chart. Materials at head of column do not go in such tubes as marked (0) in chart.

Use small pipet for all materials except salt solution.

If other sera are to be tested or you wish other controls or to control other material add as many tubes as required.

First, number tubes 1, 2, 3, etc., until all tubes are numbered so no error can be made in changing tubes. Second, add ten drops physiologic salt solution to all tubes, using an ordinary dropper. Third, add from a small pipet one drop of luetic liver extract to such tubes as indicated in

chart, or 1, 3 and 5. Fourth, add one drop of the following sera to such tubes as are designated in chart: Serum to be tested in 1 and 2, specific or positive serum in 3 and 4, normal or negative serum in 5 and 6. Fifth, add one drop guinea-pig serum or complement to tubes from 1 to 7. Now put in incubator or water bath for twenty or thirty minutes at a temperature of 37 degrees centigrade or 98.4 Fahrenheit. Sixth, after incubation add one drop proper diluted amboceptor to such tubes as designated in chart. Seventh, add one drop diluted washed sheep corpuscles, two parts corpuscles, and three parts physiologic salt solution to all tubes. Mix all materials as they are added by shaking tubes to be sure no materials adhere to side of tubes and evaporate. After adding sheep's blood and shaking return to incubator or water bath. Watch closely for from ten to thirty minutes and as a rule you are able to note findings or read results. Your test having worked correctly and your suspected serum being a strong positive, in tube 1 there will be no hemolysis, the appearance being the same as in tubes 3 and 8; 3 is your positive or specific control and 8 is your control on complement; each tube 1, 3 and 8 will look as when blood was first added. If, however, the serum tested is negative you will have complete hemolysis in tube 1, the appearance being the same as in tubes 5 and 7. Tube 5 is your negative or normal control and tube 7 your control on all tubes in test up to 7; 1, 2, 4, 5, 6 and 7 will look the same and show a complete hemolysis. If, however, after repeated test there should be a partial hemolysis of serum tested you estimate the degree of activity as a weak or faint positive. In a faint or weak positive you are hardly justified in diagnosing active syphilis, yet if after several examinations at different periods of a few weeks you still get weak or faint positive reaction you may recommend the patient for specific treatment. First, administer potassium iodid and after a few weeks treatment with the iodid re-examine the blood, for I have observed in some cases that after the administration of iodid I have got a strong positive, where previous to the administration of iodid I got a strong negative. The iodid seemingly stirs up those products in the system which cause a positive reaction. Others in Europe have made the same observations. If, however, after administering the iodid and testing the blood again you get no change in your reaction I would recommend the administration of mercury. After administering mercury a sufficient length of time re-examine the blood. If now you get a complete hemolysis you can safely conclude that the weak or faint reaction previously obtained was due to syphilis. This positive reaction sometimes found after the administration of iodid would suggest two things: The propriety of combining mercury with the iodid and of the surgical removal of gummata and other lesions when possible.

Dr. O. S. Ormsby informs me, if I quote him correctly, that he has got a positive seroreaction from the serum taken directly from an ulcer when he did not get a positive seroreaction from the blood taken elsewhere from the patient, but after the administration of iodid he got a positive seroreaction from the blood, his observations corresponding somewhat with mine.

To take blood it is best to use a blood taker or a hypodermic syringe. First sponge skin over vein with alcohol. Tie constriction above elbow to distend vein. Insert the needle in the vein at the elbow, make gentle suction on blood taker or slowly withdraw piston of the syringe. With blood taker I usually take 10 to 15 c.c. With hypodermic I take 2 to 5 c.c. Immediately after taking the blood put it into test tube and lay it on side, leave it here for five or six hours at room temperature until the serum separates, then pipet or pour off serum. Or if you wish you can centrifuge off serum from the blood as soon as taken. You can take blood from a needle prick in the thumb or finger in Wright's capsule, or any small container. To take off serum from capsule scratch the glass capsule with file and break off the small end when you can pipet off serum. I much prefer the blood taker or syringe to take blood. After serum is taken off it should be heated in water bath to 55 to 60 degrees centigrade for thirty minutes to inactivate or kill the complement. This not only destroys the complement but will improve the working of the serum in the test. If it is a serum that you wish to keep for control it should be kept in an ice box, but do not freeze. Label all materials.

In my observations in all primary external manifestations of syphilis I got a positive Wassermann and in the treatment of these cases I saw with a disappearance of these manifestations also a weakening of seroreaction to a complete hemolysis of test, or with a disappearance of all external manifestations the Wassermann test became negative. This is true of late manifestations as well. In some very rare cases late syphilitics that do not respond to any kind of treatment continue to give a positive Wassermann. I have seen clinical manifestations return soon after vigorous treatment, with return also of a positive Wassermann and under treatment have seen the clinical manifestations again disappear as well as a positive Wassermann return to a negative Wassermann. My numerous and repeated examinations extended over a period from 1907 to the present time. Many others report the same experience or findings, clearly indicating to my mind the value of the Wassermann test in the diagnosis of active syphilis. A positive seroreaction is an indication of active syphilis somewhere in the individual, whether it be in some remote part that would give no clinical manifestations, or beginning of syphilitic invasion of more vital structures, as the nervous and arterial system, visceral organs, etc., and therefore an indication for active specific treatment.

The least important manifestations in the life of a syphilitic are those that appear externally, in the skin, mucosa, etc. These alone would be an indication for treatment. It is the unseen syphilis giving no clinical manifestation which should be regarded as of the most vital importance to both the patient and physician. No one would care to await the clinical disastrous manifestations of invasion of the more vital structures as the arterial and nervous systems, liver, lungs, etc., or the recurrence in a specific meningitis when we have in the seroreaction test the means whereby we can detect an active syphilis and possibly ward off such disaster. No syphilographer or physician of to-day can say to a syphilitic

that he is cured. He can say, however, that his syphilis is not active, governing his prognosis by seroreaction test. No man is competent to treat a syphilis who does not make use of the test tube and microscope or laboratory. That syphilis is more virulent in some than in others or that some respond to treatment more readily than others makes frequent blood examinations all the more necessary. These examinations should begin with the first year of leaving off treatment and be repeated every one, two, or three years and perhaps longer, until you are assured of the virulence of the disease or the success of treatment. The treatment should be kept up a few months each year for at least the first few years even in those that respond well to treatment, governing the result of treatment, as stated above, by blood examinations. As no syphilitic can be assured that his disease will not again become active, he must be kept constantly during life under the observation of his physician and treatment every few years at farthest with blood examinations. By these observations of syphilitics many of the late forms of syphilis and possibly inherited syphilis to a great extent at least would be eliminated.

In pregnancy of a suspected syphilitic both the father's and mother's blood should be examined and if either is found positive the mother should be put upon specific treatment whether she shows a positive "Wassermann" or not. The mother's blood should be examined every two or three months during her pregnancy. No child should be permitted to nurse a mother who has shown a positive "Wassermann" at any time. A mother's milk of an active syphilitic will show positive to the test as well as her serum. Before employing wet nurses both their milk and blood, as well as the child's blood, which she is to nurse, should be subjected to a Wassermann test. This is done to protect the nurse from the syphilitic child. A child born of syphilitic parents should have its blood examined from time to time and not be put on treatment until it shows an active syphilis. By "Wassermann test" in a few years the value of Colles' and Profeta's laws should be more satisfactory established.

All syphilitics should be required to be reported by attending physicians to the health department, whether acquired or congenital. If a crusade was made against syphilis as against tuberculosis, syphilis in a few generations would be exterminated. The question of marriage of syphilitics should be more closely guarded than at the present time. If syphilis was made a compulsory reportable disease, parents would see to it that men whom their daughters were to marry had a clean health record, and vice versa. Not only would reporting syphilis benefit the moral problem but also the economic problem as well. A great saving to the state, county and city would be made if syphilis were eliminated. It is astonishing to see in large institutions the number of incurable late syphilitics, to say nothing of those put out of employment or earning capacity outside of these institutions. These subjects, unlike tuberculous subjects, may live ten, twenty, or thirty years, or perhaps even longer, wards of public charity; while tuberculous subjects usually die in from one to three years or improve and return to employment or earning capacity. Again tuber-

culous subjects do not breed degeneracy while syphilitics do. An active crusade should be instituted against syphilis for the health and the moral, economic and intellectual uplifting of mankind.

2159 Madison Street.

DISCUSSION

Dr. F. G. Harris, Chicago:—This test is of immense significance—in fact it is wonderful that it has not been fully appreciated heretofore in America. It is comparatively new here, while in Europe it is accepted without any reservation whatever. There are certain things we must consider about it. First, what is the test? It is a biologic test like the Widal reaction. It is, however, much more specific than the Widal reaction. A positive Wassermann reaction means syphilis, without any reservations whatsoever in this latitude. In the tropics there are some reservations. Like all other biologic tests a negative reaction has not the same weight as a positive. In judging the value or significance of a negative reaction we must consider the clinical history of the case. With a case that has had no treatment for syphilis, but in which the technic is absolutely above suspicion, a negative reaction has a good deal of weight.

The great hindrance to a proper appreciation of the significance of the Wassermann test has been the technic. The technic is difficult and all the attempts that have been made to simplify it, have only served to cause confusion, and have brought the Wassermann test in this country somewhat into disrepute. The technic is not as simple as Dr. Mefford would have you believe. The technic of mixing the solutions and seeing whether one hemolyzes or one does not is simple, but when we get a tube in which hemolysis is shown, it may be a negative case, whereas if another person with a less careful technic makes the test it may show positive. I am very much opposed to the drop method of doing a Wassermann. We know that this is a quantitative reaction, and when we are working with drops we are working with unknown quantities. We must know the value of certain factors in connection with this work. We have got to work with liver antigen which is known to act only with syphilitic sera. We must know that the syphilitic extract will not cause hemolysis or prevent it. We must also prove that the patient's serum alone will not bind complement and thus simulate a positive reaction. In fact there are so many treacherous details in the technic, that only one who has had a large experience with the test can have a proper conception of the difficulties encountered.

Dr. B. C. Corbus, Chicago:—I have been working with the Wassermann reaction two years. I began with the original Wassermann technic and have adhered to it throughout the whole time. With a good liver extract, a good hemolytic system, with plenty of known normal and luetic sera, the technic is not difficult to master. The Wassermann test is most valuable to the syphilographer, not only as an aid in diagnosis, but also in the treatment of syphilis.

From the thousands of cases that have been reported, its value as a diagnostic aid has been well substantiated; as far as its value in the treatment of syphilis is concerned, time alone will tell, as the test is far too recent to form any definite conclusions. At present we should be satisfied in making a diagnosis, first, by finding the spirochete in the primary lesion, or second, by the serum reaction of Wassermann.

Begin treatment at once, our aim being to get a negative Wassermann as soon as possible and to keep it negative throughout the whole time. We all know that with the cessation of treatment, a negative Wassermann will become positive; consequently, it behooves us, during the first years of the infection, to give continuous energetic treatment if we wish to obtain success later on.

Dr. Robert H. Babcock, Chicago:—The value and necessity of the Wassermann test in ordinary practice have been amply borne out by my experience with it this winter. Of a number of cases thus treated, one was combined pulmonary tuberculosis with aortic insufficiency. As this man had attacks of hemoptysis, and suspecting there might be a syphilitic basis, I had the test made and the

reaction was positive. He was put upon mercury, and his physician reported within three weeks marked improvement and cessation of the hemoptysis. Another man, a negro, who had been in the Cook County Hospital, with aortic insufficiency and presented all the signs of aortic insufficiency with mitral incompetence, gave a positive reaction. This was two months ago. He has not been given one drop of medicine save mercury and today all signs of aortic insufficiency have disappeared. Hypertrophy of the heart remains. The aortic second tone is loud and clear. There is no diastolic murmur, and the man has lost all of his cardiac symptoms. A third case, a man with aortic aneurysm, who persistently denied infection, gave a positive reaction. He was put upon mercury, and the change in his condition was simply astonishing to him and myself. The first symptom to disappear was pain, and the aneurysm itself is showing unmistakable evidences of retraction. I believe in every case of aortic aneurysm the Wassermann test should be made, and, if positive, the patient should be put upon mercury.

THE VALUE OF THE WASSERMANN REACTION IN NERVOUS AND CARDIO-VASCULAR DISEASES *

FREDERICK G. HARRIS, M.D.

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CHICAGO

There is probably no subject in medicine that has made such marked advances within the last few years as has the subject of syphilis. Metschnikoff and Roux's[1] discovery of the susceptibility of monkeys to syphilis, while not absolutely new, was of sufficient moment to stimulate study of the disease.

Schaudinn's[2] discovery of the spirochæta pallida, as the etiologic factor of syphilis, was the means of putting the pathology of syphilis on a rational basis. A direct outcome of Schaudinn's work was the discovery by Wassermann, Neisser and Bruck[3] of the method of serum diagnosis. The great value of the Wassermann reaction can hardly be estimated. It has already caused us to change many of our ideas of various phases of syphilis, and there is no branch of medicine or surgery, that will not feel the influence of this discovery.

It has long been recognized that persons giving a history of syphilis were subject to various diseases, the so-called parasyphilids, the exact pathogenesis of which was not known but might best be expressed as the result of toxic effects. We now know that syphilis is a chronic infectious disease, a septicemia due to the spirochæta pallida and that each and every focus of syphilitic inflammation is due to the presence and growth of the spirochæta pallida.

We know that the body reacts to this spirochetal infection in two ways: 1. By the production of a peculiar circumscribed area of inflammation, known since Virchow's time as a gumma. This has long been

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* Read at the Fifty-ninth Annual Meeting of the Illinois State Medical Society at Quincy, May, 1910.

1. Ann. de l'Inst. Pasteur, xvii.
2. Arb. a. d. k. Gsndhtsamte, 1905, Bd. 22, Heft 2.
3. Deutsch. med. Wchnschr., 1906, Bd. 32, No. 19, p. 745.

recognized pathologically and often clinically. 2. The production of diffuse interstitial inflammation is of much greater importance, not alone because of its greater frequency, but because it is seldom diagnosticated early. There is no doubt that the chronic connective tissue hyperplasia, characteristic of various diseases, and affecting different organs, is of this kind. Before the discovery of the spirochete this type was indistinguishable from inflammatory processes due to other causes. It is now known that inflammatory conditions of this type may be diagnosed pathologically, by the demonstration of the spirochete, and clinically, by means of the Wassermann reaction.

While syphilis is a spirochetal septicemia and we now know that no organ or tissue of the body is immune to infection, there are certain tissues, however, which seem to be points of predilection for the location of the spirochete, notably the nervous and circulatory systems.

We are all familiar with Krafft-Ebing's fruitless attempts to inoculate cases of paretic dementia with syphilitic virus. It is well recognized that syphilis plays a large rôle in the etiology of tabes and paresis, but just what that rôle is, is still a disputed point. On the one hand are those who think that a syphilitic infection acquired from five to thirty years previously caused some sort of impairment in the nerve tissue which as a result degenerates. On the other hand, are the adherents of the newer pathology of syphilis who claim that cases of tabes and paresis are still syphilitic and that the nervous disturbance is due to an active syphilis some place in the body. In paresis the syphilitic process is located in the nervous system and in tabes, probably there. This latter view is based principally on the results of the Wassermann reaction.

It might be well here to give briefly the results obtained in known syphilitic conditions.

Boas[4] reports on 864 cases of syphilis as follows:

Primary syphilis, 60 per cent. positive.
Secondary syphilis, 100 per cent. positive.
Tertiary syphilis, 97 per cent. positive.
Latent syphilis, 47 per cent positive.

Four hundred and eighty-five cases with no history or signs of syphilis were negative.

Blaschko's[5] results on 300 cases of syphilis are as follows:

Primary syphilis, 90 per cent positive.
Secondary syphilis with symptoms, 98 per cent.; 50 per cent. changed from positive to negative under treatment.
Secondary syphilis without symptoms, 80 per cent.
Tertiary syphilis with symptoms, 91 per cent. positive.
Tertiary syphilis without symptoms, 57 per cent. positive.

The above statistics show us that in spite of the usual treatment 80 per cent. of the cases during the first four years are still syphilitic and that in the tertiary stage, that is, from the fourth year on, 47 to 57 per cent. are still syphilitic.

With the exception of sleeping sickness, frambesia tropica, dourine and some cases of tubercular leprosy, no other diseases give the reaction.

4. Berl. klin. Wchnschr., 1909, Bd. 46, No. 13, p. 588.
5. Berl. klin. Wchnschr., 1908, Bd. 45, No. 14, p. 694.

At the present time the consensus of opinion is that with the exception of the above mentioned diseases a positive Wassermann reaction shows the presence of active syphilis somewhere in the body.

We have examined the blood in thirty-eight cases of tabes and obtained a positive reaction in thirty-one. From the literature we have been able to collect statistics on 280 cases of tabes, of which 72.6 per cent. showed a positive reaction in the blood or spinal fluid. In paresis the figures are even more startling; 1,188 cases from the literature showed 96.5 per cent. positive, and practically all of the recent reports show 100 per cent. positive. It seems to make no difference how old the disease is, early incomplete cases show the reaction as well as cases that are far advanced and furthermore the length of time since the syphilitic infection does not seem to influence the result of the test. All cases of paresis show a positive reaction in the blood or spinal fluid.

In sixty-two paretics, all showing a positive reaction, reported by Plaut, the time since the infection with syphilis was six to twenty-one years and the duration of the paresis varied from three weeks to six years.

Edel[6] says that the reaction is useful to differentiate paresis from diseases simulating it. Marie[7] believes that a positive reaction in the spinal fluid allows of the diagnosis of early paretic symptoms, which otherwise might be thought to be neurasthenic. From his observations Edel believes that a negative reaction excludes paresis. What has been said of tabes and paresis applies also to other syphilitic diseases of the nervous system and as Erb has said, there is no disease of the nervous system but what may have a syphilitic basis.

Berger and Rosenbach,[8] in 1879, first called attention to the coincidence of tabes and cardio-vascular disease. This association soon became well recognized and there were various more or less fantastical theories offered to explain the association. Grasset thought that the cardiac disease was due to the tabetic pains. Von Leyden, in 1885, thought the association was purely accidental.

Strümpell,[9] in 1907, again called attention to the prevalence of cardiac disease in tabes. He reported sixteen cases of this combination and was able to show that 62 per cent. of these cases certainly or very probably had had syphilis. Rogge and Müller,[10] in twenty-two cases of tabes entering Strümpell's clinic found eight with evidence of cardiac involvement.

In the light of the newer researches on syphilis this association of tabes and circulatory disease becomes more significant and the question naturally arises, is syphilitic involvement of the circulatory system always a late effect? May it not also be present in early syphilis?

Ricord, in 1845, was the first to describe syphilis of the heart, showing a case of gumma of the left ventricle. This, to be sure, is a rare occurrence for Stockmann,[11] up to 1904, was only able to collect eighty cases.

6. Allgem. Zeitschr. f. Psych., 1909, Bd. 66, No. 1, p. 217.
7. Vide-Wassermann Deutsch. Zeitschr.f. Nervenheilkunde, Bd. 36, Heft 1-2, p. 73.
8. Berl. klin. Wchnschr., 1879, No. 27, p. 402.
9. Deutsch. med. Wchnschr., 1907, Bd. 33, No. 47, p. 1931.
10. Deutsch. Arch. f. klin. Med., 1907, Bd. 89, Nos. 5-6, p. 514.
11. Quoted by Bruhns.

However, there is no doubt but that it is very much more common, which is accounted for by the impossibility of diagnosing the condition clinically, and a scar of a healed gumma has nothing characteristic by which the syphilitic nature of the previous process can be determined.

Mracek,[12] in an extensive study of the pathologic changes in hearts of congenital syphilitic infants, found extensive interstitial changes in a number of cases. Bruhns,[13] in six of nine cases of congenital syphilis, found similar changes in the myocardium. The same pathologic conditions probably occurring in children and young adults are due to an interstitial inflammation of syphilitic origin.

Fournier[14] and Mracek[15] have called attention to the presence of cardiac symptoms during secondary syphilis. Grassmann,[16] in a large series of cases of early syphilis found evidence of cardiac involvement in two-thirds. Undoubtedly some of these disturbances were functional, but one must admit the possibility of many of them being organic, the syphilitic inflammation later subsiding under the antisyphilitic treatment.

There is probably no part of the heart that may not be affected by the disease. From our study of the literature it would seem that the pericardium is least often involved. Engle-Reimer[17] and Foerster[18] have reported cases of pericarditis in early syphilis.

Endocarditis of syphilitic origin is certainly very much more common than has hitherto been suspected. When one thinks of the cases of valvular disease in which there is no history of previous infections such as ordinarily cause endocarditis, one must admit that there are a goodly number of cases that might be syphilitic. The difficulty has been to determine the syphilitic nature of the process.

We are all aware of the unreliability of the patients' statements. Heretofore we have been compelled to base our opinion on the presence or absence of signs of syphilis. This is of little more value than the patients' statements. Palmer[19] examined 600 women who were known to have had primary or secondary syphilis several months previously, and could find no signs of the disease in any of them. The only means by which we can diagnose these conditions is the Wassermann reaction.

A case in point is the following: A man aged 34 years, a teamster by occupation, entered the Cook County Hospital, October 24, 1908, with all the evidence of cardiac disease in the stage of broken compensation. The history was negative, except for a syphilitic infection four years previous. Three years after his infection, he began to complain of shortness of breath on exertion and edema of the ankles. It was a question whether the syphilis was the cause. A Wassermann test was strongly positive. Two months later the case came to autopsy and showed a very marked stenosis and regurgitation of both the mitral and aortic

12. Vidi-Von Renvers V. Int. Cong. f. Dermatology, 1904, Bd. 11, p. 215.
13. Berl. klin. Wchnschr., 1906, Bd. 43, No. 8, p. 217.
14. Lecons sur la Syphilis-Paris, 1881.
15. Vivi-v. Renvers v. Int. Cong.
16. Münch. med. Wchnschr., 1907, xliv, Nos. 18-19, Arch. f. klin. Med., 1901. Nos. 68-69, p. 445.
17. Vidi-v. Renvers, Loc. Cit.
18. Ibid.
19. Deutsch. med. Wchnschr., 1895, Bd. 21, No. 5, p. 76.

valves. The valvular changes presented nothing by which the syphilitic nature of the process could be determined. The aorta, however, showed a very marked syphilitic aortitis. We have had two other similar cases since, both giving a positive Wassermann reaction. Schütze[20] reports six cases of aortic valve disease all showing a positive reaction.

The valve most commonly affected is the aortic. It has long been known that a large majority of the cases of aortic valvular disease gave a history of syphilis, but that the changes are due to a syphilitic inflammation of those valves is a new conception of the disease, and yet the results of the Wassermann reaction show such to be the case and the spirochæta pallida have been found in these valves. This pathogenesis of aortic disease best accounts for the progressive character of the affection; and indicates an etiologic treatment that promises much, if instituted early.

Probably the aorta is the part of the circulatory system most frequently affected by syphilis. Doehle,[21] in 1845, first called attention to the fact that there was a typical form of sclerosis of the aorta, which was of syphilitic origin and should be sharply differentiated from the ordinary forms of arterio-sclerosis and atheroma. Heller[22] later made an exhaustive study of the condition, and the disease bears his name. Chiari[23] found Heller's aortitis present in one-half of all autopsies on known syphilitics and in 47 per cent. of cases of paresis.

It is only since the discovery of the spirochete that the condition could be shown to be a syphilitic aortitis due to the spirochæta pallida. Schmorl[24] and others have found them in large numbers in Heller's type of aortitis. Wright[25] has found the spirochete in about 50 per cent. of the cases of suspected syphilitic aortitis. This is an important addition to our knowledge, for there is no doubt that we shall eventually be able to recognize syphilitic aortitis as a distinct clinical entity, and we will then be in a position to institute proper treatment early and thus prevent more serious changes. We shall not discuss the clinical symptoms of this condition, but merely say that the syphilitic etiology is shown by the fact that these cases all give a positive Wassermann test. Frankel and Much,[26] in eighteen cases of aortitis at post-mortem, found thirteen gave a positive Wassermann. In the five negative cases they thought the syphilis was cured. Schütze[27] reports two cases of aortitis and one of coronary sclerosis which were positive during life.

The necessity for an early diagnosis of this condition is apparent when we realize that it is the preliminary stage in the formation of aneurysms. Etienne,[28] in 240 aneurysms, found positive evidence of syphilis in 69 per cent. Düring[29] says that between 56 and 85 per cent. of all aneurysms show signs of syphilis and that the great majority of all

20. Deutsch. Zeitschr f. Chirug., 1908, Bd. 95, Nos. 1-5, p. 13.
21. Dissert., Kiel, 1885.
22. Verhandl. d. ii. pathol. Gesellsch, Münich, 1899.
23. Vidi-Bruhns, Berl. klin. Wchnschr., 1906, Bd. 43, No. 17, p. 513.
24. Hoffmann's Atlas, Plate XX, Fig. 4.
25. Jour. A. M. A., 1909, Vol. lii, No. 18, p. 1454.
26. Münch. med. Wchnschr., 1908, Bd. 55, No. 48, p. 2479.
27. Loc. cit.
28. Ann. de Derm., 1897, viii, No. 1, p. 1.
29. V. Int. Cong. f. Dermatology, 1904, Bd. 2, p. 194.

aneurysms in persons under 50 years are due to syphilis. With these figures in mind one naturally wonders what the Wassermann reaction shows in these cases. We have examined one innominate, and twenty-five aortic aneurysms in patients varying in age from 33 to 55 years. Of these patients twenty-three gave a positive Wassermann reaction.

These results place the subject of aneurysms in a new light and we shall have to consider the vast majority of them, especially in persons under 50 years, as being manifestations of an active syphilitic process in the aorta itself, and these cases are just as syphilitic and require anti-syphilitic treatment just as much as if the syphilitic process was located on the skin and visible.

This is also true of a large number of cases of aortic valve disease and of a much smaller number of cases of mitral disease. An active syphilitic process in the heart or arteries requires antisyphilitic treatment as much as a syphilitic process on the skin or any other part of the body. In the nervous and cardio-vascular cases that we have had an opportunity to treat and control the treatment by repeated Wassermann tests, we have been able to obtain a negative reaction in all, although these cases require more energetic and prolonged treatment than do cases of early syphilis. Judging by the results obtained in the comparatively small number of these cases, we believe that this "so-called" biologic method of treatment is indicated, and will be followed by as satisfactory results in this class of cases as in cases of early syphilis.

All authors mention the marked value of the iodids in aneurysm and aortic disease, and it is very probable that it is in just these syphilitic cases that the good effects are seen. We know now, however, that the iodids have practically no effect in removing the cause of syphilis, and that mercurials are of far more value. Of course it is not to be expected that any destruction that has taken place will be replaced, but the progression which is so characteristic in these conditions may be prevented.

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THE RELATIONS AND CLINICAL SIGNIFICANCE OF THE URINARY ACIDITY *

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One is tempted to believe from a study of the literature on this particular subject that it is of little or no significance. In fact very little space is devoted in most text-books to the discussion of the importance of the urinary acidity. One learns that the reaction of the urine is normally acid, that at certain times of the day it may be amphoteric or even alkaline and that an alkaline urine is in all probability an

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evidence of cystitis or retention. The litmus-paper test is referred to, the burette method of estimating this factor is mentioned and, generally speaking, the whole subject is passed by very superficially. In addition to this current medical literature has until the last year evidenced a decided paucity of discussion along this line. It is encouraging to notice that as medicine progresses a greater interest is being manifested in the so-called "minor matters" and the study of the urinary acidity and its relations will soon be considered in its proper light.

The information obtained by the careful estimation of the urinary acidity is of very great clinical import. In my estimation it is one of the most important of the urinary findings and a factor which should be known as a matter of course in the routine examination of every case; for the conditions associated with a decreased blood alkalinity have been found time and again associated with several other definite findings, and it has been shown by laboratory experiment, as well as by clinical experience, that therapeutics based on this particular finding have given most salutary results.

The reason that the condition of high urinary acidity and the usual associated clinical and laboratory findings have not been more frequently found and described together is that they have been so seldom looked for. The determination of the reaction of the urine by the obsolete litmus method is as far as most physicians care to go in their urinalyses. The degree of acidity is estimated in the larger clinical laboratories, but it is the exception rather than the rule to find the average physician taking the time or trouble to make this simple test. "What good is it anyway?" they say. "If I can see a specimen of urine and make a test for albumin and sugar, and find out the specific gravity, I'm satisfied."

This is an unfortunate state of affairs, for the acid-index is a factor of considerably more than ordinary importance, has a direct and close relation to metabolism and elimination, and is, therefore, a guide of no mean value to the physician who is endeavoring to care for indefinite and obscure ailments.

The estimation of the urinary acidity is not a difficult procedure. It can be very simply and quickly estimated in the laboratory with a burette, or anywhere with an acidimeter and no other reagents than deci-normal soda solution and a phenolphthalein indicator solution. Some writers have said that this test is far from accurate and for this reason have depreciated it. There is not a doubt of the futility of endeavoring to accurately estimate the total acidity by the above method; but in clinical laboratory work we do not expect a grade of volumetric or gravimetric work which can be compared, say, to the work of the assayer or metallurgist. In medicine we are satisfied with approximate figures. To prove this I merely mention the notoriously inaccurate methods in general use for the estimation of albumin, urea and, for that matter, practically every quantitative urinary test save alone the estimation of nitrogen.

The fact that the actual total acidity of the urine is a factor which is practically impossible to obtain with any absolute degree of accuracy does not deter the practical physician from making the test. Let us give here an illustration. A specimen is examined and the acidity is deter-

mined to be 40 degrees. The amount passed is one liter. The reaction to litmus is, of course, acid. A second specimen is examined and the acidity found to be 120 degrees with an amount approximating 1,500 c.c. The litmus test is also acid. Is there any material difference between the condition of the alkalinity of the blood in these two cases? Assuredly. In the first case the number of acid units is 40,000 (practically the average normal figure) and in the second, 180,000, or a good deal more than four times the normal. Surely there is an evident difference here.

Personally I have encountered no little skepticism regarding the real clinical importance of the matter under discussion here. I presume that this is only natural. Too often we are prone to overlook the more common things simply because we do not realize their significance. The "theory of autointoxication" first taught by Bouchard has within twenty years become one of the most important and widely-recognized factors in the pathogeny of all disease, and yet the eminent internist and investigator, von Noorden, himself, admits that: "At first we German physicians were by no means inclined to accept the theory of autointoxication that was being so enthusiastically proclaimed. Of late years, however, our attitude has become more friendly to the doctrine. This change of front is due to the fact that a number of the toxic products of metabolism have actually been isolated and their mode of origin in the organism, and their pathologic effect determined to the satisfaction of the former critics."

If I am not greatly in error the clinical significance of the urinary acidity will be in the years to come one of the essential diagnostic factors. It will be estimated in every case and, to a certain extent, upon its variations will depend the rational treatment of the majority of diseases.

In a paper which I wrote in the spring of 1909, and published in the *Medical Record* early in June of that year, I gave the results of a series of about 250 urinalyses which proved, to me at least, that there was a close relationship between excessive urinary acidity and indicanuria. My work since then, as well as that of a number of friends and correspondents, has only served to corroborate this finding. Evidently the condition which is known to cause the presence of indican in the urine is also responsible for a marked increase in the acidity. In the above paper I also called attention to the fact that practically 25 per cent. of the whole series showing excessive acidity also evidenced casts, usually of the hyaline type, and, at times, traces of albumin. It is pleasing to note that investigators elsewhere are corroborating these findings. Von Hoesslin[1] states that albuminuria and cylindruria are in some cases directly dependent upon the acidity of the urine. In these cases albumin and the formed elements disappear entirely or diminish in degree if the urinary acidity is decreased by the administration of sodium bicarbonate. He believes that it is necessary to determine the relationship of all albuminurias to the existing acid index.

Another very common disturbance in the relations of the urinary findings is that with an excessive acidity there is frequently found a markedly

1. München. med. Wchnschr., Aug. 17, 1909.

lowered urea-index. The total solids are decreased in some cases as low as one-third of the normal. This shows conclusively that urinary hyperacidity is associated directly with the metabolism. The urea-content is diminished because the urea-precursors are neutralized by the excess of abnormal acid-substances in the blood and eliminated as ammonia compounds. As a result the amount of ammonia in the urine is usually excessive in these cases. Then again, since the solids are often so decidedly diminished, it would seem that the organism is storing up trouble for itself in the form of the effete metabolic products which should normally be eliminated. This seems to be proved true by the not infrequent "crises" in which the individual who for weeks and months has been eliminating much less than the normal is suddenly taken seriously ill and the urine shows not only a tremendous acidity (265 degrees was, I believe, the highest figure seen in my laboratory), but the solids are also markedly increased. Naturally in these cases there are abundant evidences of renal irritation.

It may not be out of place here to call attention to the fact that upon the normal alkalinity of the blood depends two of its most important functions, oxygen-carbon-dioxid exchange and phagocytosis. Any condition or combination of conditions which would tend to decrease either of these powers must evidently have an important and wide-spread influence upon the general disease-resisting capacity of the organism. Acidemia, or diminished blood-alkalinity, will be found in practically all chronic diseases and, for that matter, in many acute diseases; and it is confidently believed that this factor of urinary hyperacidity is of sufficient importance to be known and its variations carefully watched in all cases. One can quickly corroborate these statements by making an examination of the urinary acidity of a twenty-four-hour specimen, of course, in the most frequently encountered condition of lowered resistance, the common cold. The acidity is almost invariably increased; and, what is of more importance, demonstrating even more conclusively that this matter is worthy of consideration, the administration of alkalies will do much to favor the breaking up of the cold.

I could enumerate case after case in which the urinary findings and ultimate outcome proved unquestionably that acidemia is a condition worthy of careful consideration. Two or three will suffice here: A colleague while visiting in Seattle was invited to see a case of severe throat ulceration which was interesting because of the extent of the disease and its intractability. The little girl had been for several weeks suffering with a membranous condition of the throat and pharyngeal walls which was becoming progressively worse. Heroic doses of diphtheria antitoxin, swabbings with silver nitrate solution and the best treatment that one of the leading specialists could afford seemed without avail. My friend asked if the urine had been examined. No. Might it not be done at once? Certainly. A specimen obtained in the office and tested in the acidimeter showed an acidity of nearly 180 degrees. A twenty-four-hour specimen which was begun immediately was tested the next day and the acidity found to be practically the same. The case was treated with a sodium bicarbonate mixture until the acidity of the urine was normal, and within a few days the membrane and every evidence of the condition had disappeared save a marked hyperemia of the pharynx.

Again a prominent business man in Washington, D. C., was suffering from a nervous condition which had baffled a number of the best physicians there. He

accidentally came under the notice of a friend of mine and it was suggested that the urine be carefully examined. It was found to be excessively acid and the commonly-occurring associated findings mentioned before were also thoroughly in evidence. To make a long story short the sufferer, who had almost given up hope, was treated as an acidemic and within a few weeks was another man. This sounds almost like a patent medicine story; but it is not.

Still another case which I have watched personally for considerably over a year. A young man suffered from frequent epileptic seizures. When I was consulted the urine was, of course, examined. It was found to be excessively acid, much indican was present and the solids were very low. The acidity was reduced, the indican eliminated and to make another long story short the seizures ceased, to return only when the conditions were not as carefully watched as they should have been. The only treatment has been to keep down the acidity and to prevent the circumstances which caused it. In about eighteen months there have been only two or three attacks and the urine passed before and after them was excessively acid and toxic.

In discussing this subject last summer with Dr. Frederic E. Sondern, of New York, he made a remark which will bear repetition here. In answer to a question concerning the difference between "acidemia" and "acidosis" he said that β-oxybutyric acid or its congeners was an essential to true acidosis. This, then, shows that there is a decided difference between the acid-condition of diabetes mellitus and the condition called acidemia now under discussion. The treatment may be essentially the same, and, for that matter, a part of the underlying cause the same, but the two conditions are essentially different and must not be confused.

Doctor Sondern also said that it would be something worth while if the "acid-substances" which evidently cause this troublesome condition could be isolated and named. Possibly this may be accomplished later, but in the meantime we must be satisfied with knowing that they are there and that their presence warrants attention. In all probability these "acid-substances" are closely related to the sulphuric acid products of intestinal putrefaction, to indolacetic acid, indican and skatol. For clinical purposes, however, it is not always absolutely necessary to know the definite scientific name of the *causus mali*. The fact that it is there and the means known whereby its effects can be counteracted is more than enough for all practical purposes.

It might be well here to give the principal factors which cause variations in the reaction of the urine. The acidity is increased by autotoxemia, fever, diminished output of urine, the ingestion of an excess of proteid food and certain more or less obscure metabolic disturbances, among which diabetes mellitus stands first. On the other hand the main factors causing a diminished acidity of the urine are alkalies taken internally, the ingestion of fruit acids, cachexia or a marked diminution in the metabolic activities of the body, and diuresis. It is well to remember that diuresis decreases the acidity of the urine and that the decrease is proportional in degree to the extent of the diuresis no matter how the increased flow of urine is brought about. One other important factor must not be overlooked. Any circumstance which causes fermentation of the urine, no matter whether *in vivo* or *in vitro*, will reduce its acidity. For this reason when cystitis or prostatitis is present due allowance for these conditions must be made. Again the urine should be examined as

soon after the collection as possible and steps taken to prevent the onset of the usual ammoniacal fermentation for obvious reasons.

It would seem from the foregoing that the following conclusions might properly be drawn:

1. The study of the urinary acidity and its relations is worthy of much wider attention.

2. Its clinical significance is of importance in *all* disease conditions, but more especially in the indefinite and obscure chronic diseases.

3. The acid-index is a factor of considerably more importance than has yet been supposed and has an intimate relation with the phenomena commonly found with intestinal putrefaction and autotoxemia.

4. The urinary acidity is not only of importance in diagnosis, but also serves as a valuable guide during the period of treatment.

5. The frequent finding of evidences of kidney irritation would lead us to believe that the conditions causing urinary hyperacidity are important predisposing factors in the causation of nephritis.

6. The test for the degree of acidity is simplicity itself and can be easily accomplished either with a burette or an acidimeter.

7. The clinical indications and therapeutic possibilities suggested by these findings will more than repay one for the slight trouble required in making the tests.

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DISCUSSION.

Dr. John Ritter, Chicago: This paper is interesting from the standpoint of one who is doing tuberculosis work. I read a paper a few weeks ago in Washington in regard to albuminuria in its relation to tuberculosis. It has been proved especially by French writers that a great many cases of albuminuria are really tuberculosis; that in many cases, in the young especially, in which we find albumin in the urine the physical findings will eventually disclose tuberculosis, and when the albuminuria ceases the tuberculous process in the lung is developed; that these tuberculous processes go on in the lungs, and finally a healing process takes place, and when it has occurred the albuminuria usually returns again. Among the French writers who have been working along this line, Professor Tiessier, of France, has followed thirty cases of from three to six years' duration, the patients having slight albuminuria in the beginning and at the time of death had pronounced tuberculosis. They began with a slight albuminuria that lasted four or five months without physical findings in the chest, but finally tuberculosis developed. These cases he designates by the sufficiently comprehensive name as cases of "pretuberculous albuminuria."

SOME OF THE NEWER IDEAS IN THE PHYSIOLOGY OF DIGESTION IN HEALTH AND DISEASE *

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As disorders of digestion furnish the average practitioner with the largest part of his daily problems, any light which can be thrown upon these common but complex questions will be of interest to us all. Per-

* Read at the Meeting of the Jo Daviess County Medical Society at Stockton, Illinois, July, 1910.

haps in no other branch of medicine have greater advances been made during the last decade than in the problems of digestion. Even the eminent Ludwig, of Leipsic, was found to be in error. He had maintained that digestion was the result of chemical changes due simply to the presence of food in the stomach or intestines. Now, we know that the process of digestion consists of a complicated but complete sequence of events in which psychical, secretory and motor elements must be considered.

In spite of the colossal and inspiring researches of Pawlow and his fellows, by which, from a physiologist's point of view, the whole aspect of the digestive process has been changed, the medical profession as a whole has remained in more or less complete ignorance. Exception must be made in the case of those who are actively engaged in the teaching of physiology in the leading centers of medical education, who have followed the development of these problems with characteristic interest and who have been busily engaged in studying and classifying the results of these investigations.

It is more with the purpose of bringing to your attention a few of the results of these researches than to report any original work, that I have accepted the invitation of your secretary to supply a paper for this meeting.

The anatomy and physiology of the salivary glands as laid down in the text books are both familiar to you and I will not go into any description of these.

Some of the most interesting and valuable work done on problems of the physiology of digestion has been done by European investigators, and during the past few years great inspiration and impetus has been derived from the research and experimental work of the Russians.

The work by Pawlow and his co-workers was done at the Institute of Experimental Medicine in St. Petersburg. Unfortunately for us, many of the results of these investigations were recorded in Russian journals and consequently were inaccessible to the majority of medical men until a German translation of Professor Pawlow's lectures appeared. In the English translation of this book[1] published some four years later was presented in an exceedingly interesting manner the results of the research and experiments carried on in his laboratory. This directed the attention of physiologists generally to the problems of digestion and soon investigators all over the world were working at these studies with renewed interest and zeal.

Secretion of Saliva:—Carl Ludwig and Heidenhain long ago showed that there are two sets of nerves which call forth the secretion of saliva, one from the central nervous system, the corda tympani, which produces a saliva rich in fluid but poor in ferments, and one from the cervical sympathetic producing fluid small in amount but rich in ferment. Langley showed that the alternate stimulation of the two would cause an increase in amount of saliva which would result from the stimulation of

1. Pawlow: The Work of the Digestive Glands, London, 1902.

the sympathic system only; that is, that there was a conjoint action of these two systems of nerves in the secretion of the saliva.

But Pawlow demonstrated that these glands possessed in addition a factor of specific excitability. He has shown that the secretion of saliva was influenced by psychic stimulation such as: 1. Longing for food; sight of food; thought of food; smell of food. 2. By direct stimulation by contact. That they possessed a definite physiologic sense.

Our own daily experiences teach us that the activity of the salivary glands is influenced to a considerable degree even before the introduction of food into the mouth. The sight or even thought of food when the stomach is empty is capable of setting up an active secretion of saliva, reminding us of the well known expression, "To make one's mouth water." Hence a psychic event, an eager longing for food, must be considered as one of the active causes of the salivary secretion. The secretion is also influenced very markedly by direct stimulation by contact of food in the mouth.

In addition Pawlow observes that the saliva is the first fluid with which objects entering the alimentary canal must come in contact. As host, then, it has many duties to perform and in fact we find it moistens the dry acts, as an aid to mastication, dissolves the soluble, envelops the hard with mucus, enabling it to pass easily down the esophagus, neutralizes strong acids and also performs a function which is rarely considered, but is of great importance, that of a washing out or cleansing fluid. Pawlow holds that substances which are placed in the mouth set up a secretion of saliva because we have here the seat of definite physiologic sense, and cites the following experiments as performed in his laboratory. Dr. Glinski isolated the orifice of the salivary glands in dogs, brought them out of the oral cavity and caused them to heal into the edge of the skin wounds. This method, though given publicity by Pawlow and his pupils, was first used by DeGraaf and described on plate from Rene de Graaf's treatise "De Succo Pancreatico" from "Regneri de Graaf Opera Omina" Ludg Batav. 1677. The first experiments were done with the submaxillary gland. A small test tube was attached to the skin over the opening of the gland. The animal was then tempted with a piece of flesh, the tube immediately filled with the saliva. Applying a new tube and feeding the animal the meat the tube was also filled with saliva. Again applying a new tube and throwing a pinch of fine sand into the dog's mouth, the result was a copious secretion of saliva. The results were identical after applying a tip of feather dipped in an acid solution. In order to ascertain if all the glands concerned in the secretion of saliva were acted upon in a similar manner, another dog was used in which the parotid duct was diverted outwards. The saliva being collected in the same way, the dog was tempted with a piece of meat, but strange to say no secretion resulted, and notwithstanding the animal was hungry and eager for the offered food. When raw meat was given the animal to eat, the secretion was again absent. Proceeding further, finely powdered dry flesh was given and all at once an abundant secretion was obtained. The introduction of stones into the mouth evoked no secretion at all, the animal being able to

remove them without the aid of any moistening, but the introduction of sand, however, was followed by a copious secretion of thin watery saliva, which enabled the animal to wash the sand from the surface of the mouth and reject it. The psychic effect of showing the dog meat and then tantalizing him was shown by the secretion ceasing as soon as the animal realized that it was being played with and that there was no intention of really giving it the food.

These experiments, enforced by similar results in dogs with both glands exposed and in repeated instances on different dogs, demonstrated a specific rather than a general excitability of these glands, as has been commonly thought.

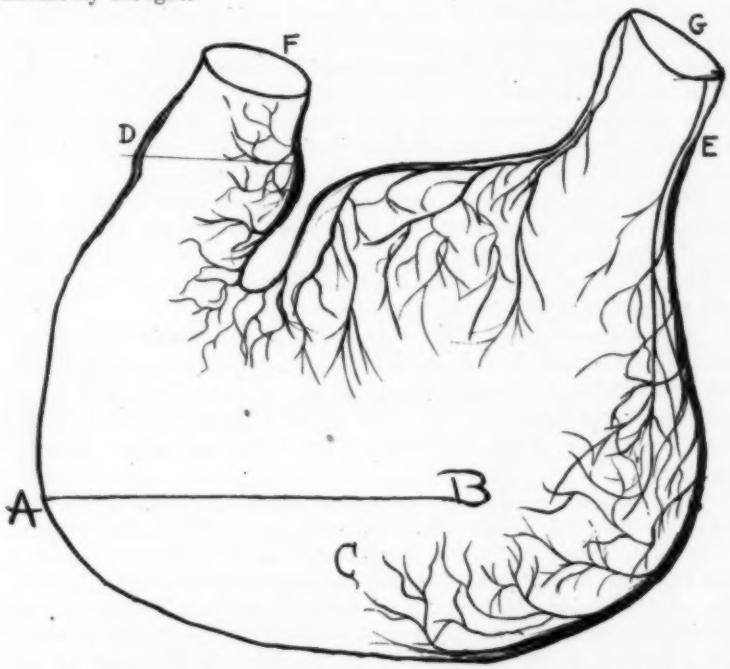

Fig. 1.—Pawlow Pouch. A, B, incision; C, flap to form stomach pouch; D, anterior vagi plexus gastricus; E, posterior vagi plexus gastricus; F, pylorus; G, esophagus.

Gastric Secretions.—Believing that much definite information in regard to the secretion of gastric juices could be obtained by experimenting on lower animals, Pawlow instituted a series of experiments on dogs, in which he had made a special separate stomach pouch and fistula, in such a manner as to divide the organ into two portions so that by uniting the edges of each two distinct bags or pouches were formed, the larger being continuous with the esophagus and duodenum, while the smaller one is converted into a blind pouch with a fistula leading to the abdominal surface. The two stomachs are continuous only by the peritoneum and muscularis, and are separated by the mucous membrane which forms the

floor of the upper portion and the roof of the lower pouch. Both stomachs have the same nerve and blood supply and react the same on account of the fact that the vessels and nerves are located in the muscularis and serosa. When, therefore, the secretion of gastric juice is stimulated in any manner, a juice can be collected from the fistula which is identical with that of the stomach itself. This fluid can be readily studied, as it is free from any contaminating food or other substances.

The first normal impulse in gastric secretion is mental and has been termed appetite juice by Pawlow. In determining this, dogs were used in which, in addition to the stomach pouch, the esophagus had been divided and the cut ends brought out to the skin surface. In dogs thus prepared, the swallowing of stones or small pebbles which passed down the esophagus to be dropped out of the opening in the neck of the animal, failed to have any effect on the secretion. The same results were obtained when the dog's tongue and inside of mouth were stimulated by diluted acids or bitter substances, but when some pieces of fresh meat were cut up and handled in front of the animal, there followed, invariably, a strong secretion of gastric juice from the gastric pouch.

In this later experiment, Pawlow confirmed the experiments of Bidder and Schmidt, made forty years ago, that the offering of food to a healthy dog produced a flow of gastric juice. When the meat was then fed to the animal but was passed out of the esophagus as before, there was a secretion of juice but smaller in amount.

Repeated experiments upon dogs by Bickel and Sasaki[2] have shown that anger, mental irritation, and emotional disturbances exert a decidedly inhibitory influence upon gastric secretions. Beaumont,[3] as long ago as 1833, made the remark in his observations of gastric secretions in the French voyageur, Alexis St. Martin, that "Fear and anger check its secretion."

That the same is true of the human stomach has been shown by a long list of careful observers in experiments on suitable human subjects.

Effect of Saliva on Gastric Secretion.—Fricker, of Berlin, reports a series of experiments in his own person, confirming the assumption that the act of chewing promotes the secretion of gastric juice, but his contention that the arrival in the stomach of saliva has any specific stimulating influence on the secretion of gastric juice, is disproven by the researches of Pawlow and especially of Troller,[4] who proved that the gastric secretion was entirely uninfluenced by the presence of saliva in the stomach.

Pawlow and Popielski have shown that by the action of certain proteids upon the mucosa of the pyloric end of the stomach, there is excited in the glandular structure of the part, a substance which passes into the general circulation, returns to the gastric mucosa and excites therein an active secretion of gastric juice. This phenomenon was observed repeatedly after the destruction of all nerves connecting the stomach with the

2. Bickel and Sasaki: Deutsch. med. Wchnschr., 1905, xxx, 1829.
3. Beaumont: Physiology and Experiments, Burlington, Vt., 1847.
4. Troller: Ztschr. f. Klin. Med., 1899, xxxvii, 183.

ganglionic centers. Edkins[5] has shown that this is not the result of a local reflex in the gastric walls, but is due to a chemical influence. Edkins has also demonstrated that the contact of certain food products, such as dextrins, maltose and dextrose, and especially extract of meat, with the pyloric end of the stomach, causes the formation of a chemical

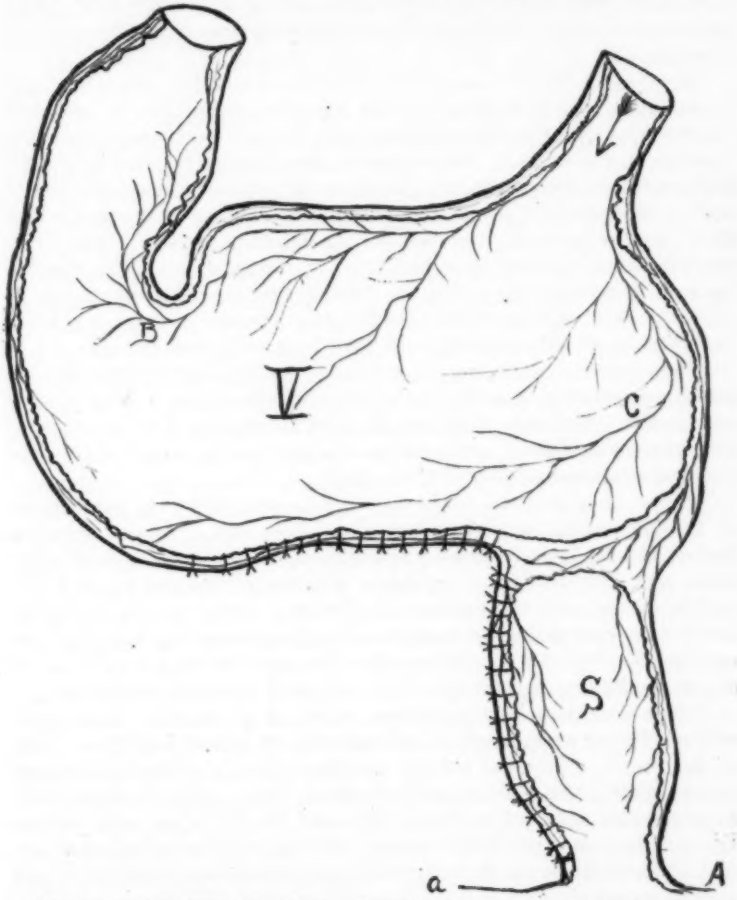

Fig. 2.—Pawlow Pouch (completed). V, cavity of stomach; S, Pawlow's pouch; A, abdominal wall; B, anterior vagi; C, posterior vagi.

substance, a hormone or secretagogue, which being absorbed by the general circulation acts as a powerful stimulus to gastric secretion.

Many observers in experimenting with bitter stomachics,[6] have concluded that these, of themselves, introduced directly into the stomach

5. Edkins: Proc. of Royal Soc., 1905, Series B, 376.

6. Lavenson: Arch. Int. Med., 1909, iv, 280; Borrisow: Arch. Exper. Path. u. Pharmakol., 1904, li, 363; Hoppe: Berl. klin. Wchnschr., 1905, xxxiii, 1038; Straschesko: Russk. Vrach., 1905, quoted by Hoppe, Berl. klin. Wchnschr., 1905, xxxiii, 1038; Kaznelson: Arch. f. d. ger. Phys. (Pflugers), 1907, cxviii, 327.

induce no secretion but if taken by mouth or shortly before a solution of beef juice, a considerable increase of juice resulted.

In this connection it is pertinent to inquire whether we have not been directing too much attention to the drug treatment of certain disorders of digestion and neglecting very valuable and helpful agencies. As has been shown, both the psychic and dietetic are rational methods of inducing secretion in the stomach and should be given more of our thought and attention.

Here again we are impressed with the wonderful adaptation and interrelation and dependence of the digestive organs for, as we shall observe later, a copious flow of gastric juice not only performs its digestive function in the stomach, but because of the stimulating effect of gastric HCl on the duodenal cells, an abundance of pancreatic juice and bile as well as the intestinal juices are secured. In addition to the part which HCl plays in preparing the food for the action of pepsin, it also has a decided action in stimulating peristalsis in the intestines. The observations of Pawlow and his colleagues, showing that the actual percentage of HCl is constant and that changes in diet and influence of drugs only affect the secretion of HCl quantitatively, have been confirmed by many.

They found that the use of meats and animal extractives caused a prolonged secretion of acid juice while vegetables caused a much shorter and smaller secretion. This would seem to confirm the teachings of Jurgenson, Von Jaksch, and Sohlern, who empirically advised against the use of meats in cases of hyperchlorhydria.

Portis,[7] in a series of interesting experiments, following the methods of Pawlow, confirmed these observations. He also cited the report of Bickel, who conducted a series of experiments on a normal stomach of an adult girl, who because of a benign stricture of the esophagus had a gastric fistula, and in imitation of Pawlow's work, cut the esophagus across, the upper end being brought out to the skin surface and the lower end closed. Bickel's conclusions that the same principles hold in the case of the human stomach have been confirmed by several observers.

Portis concludes that vegetables, especially a vegetable puree made without the use of any meat, is an ideal diet in hyperchlorhydria. Next to these milk, cream and butter, together with egg albumen and toast may be useful, also alkalies such as sodium bicarb. taken in large quantities one-half hour before meals. Oils and fat act in the same manner and are also best given before meals. Of the drugs belladonna and bromid of strontium were the only ones that affected the secretion to any marked extent.

Gastric secretion is probably stimulated by three principal factors:

1. A purely psychic stimulus, as the eager longing for food. Appetite juice. Pawlow says: "A good appetite in eating is equivalent from the outset to a vigorous secretion of the strongest juice; where there is no appetite this juice is absent. To restore appetite to a man, means to secure him a large stock of gastric juice wherewith to begin the digestion of the meal." This fact does not apply, of course, in cases of simple

7. Portis: ILLINOIS MEDICAL JOURNAL, 1909, xv, 267.

atony of the stomach or carcinoma. Here, we often have ravenous appetites but on account of structural changes, there is an absence of HCl which is characteristic.

2. That resulting from the eating of food of pleasing taste and form augmented by the stimulating influence on the mucous membrane of certain extractives contained in the food itself. Clinically you can frequently get a patient to take considerable quantities of food by urging him to taste and eat even a small quantity of some appetizing or attractive food.

3. By the specific act of some chemical substances formed in the pylorus and acting through the blood, similar in form and action to the "secretin" of Bayliss and Starling.

Movements of Stomach During Digestion.—In the process of kneading and grinding, by which the food is mixed with gastric juice, there are two principal divisions. One occurring in the fundus or cardiac portion by which the easily mobile, more fluid and more gruelly portions of food are gradually pressed downward into the pyloric portion; the coarser and more dense portions remaining to receive a longer contact with the digestive juices. Here the principal action is probably of a chemical nature.

The second, a more mechanical action taking place in the pyloric end where by its more powerful contraction, the bits of food are further broken up and mixed and ground up with the gastric juices.

Very interesting and valuable information in regard to the motor activities of the stomach has been furnished by the recent studies of Kastle, Rieder and Rosenthal[8] in kinematographic reproduction of the physiologic movements of the stomach. They found that a fold of the stomach wall formed above the pylorus and protrudes inside. This gradually extends inward and growing longer and longer with the tip curving down toward the pyloric outlet. In these moving pictures it appears as though this fold were pushing or pressing down the food through the pylorus and after this was accomplished the fold receded and was reformed, repeating the process. The character and movements of this fold were distinctly different in normal stomachs and in cases of carcinoma, and the authors express hope that this method of examination will prove of great value in diagnosis.

Cannon[9] has shown by means of Roentgen ray photographs that by the action of strong circular fibres placed between cardia and pylorus, the two portions of the stomach are partially separated from each other and that the principal peristalsis occurs in the pyloric portion. It has also been demonstrated by the same observer that emotion plays a considerable part in the movements of the stomach, and that peristalsis ceases whenever the animal manifests signs of rage, distress, or even anxiety.

In a series of experiments on cats, Hedblom and Cannon[10] have concluded that coarse branny food leaves the stomach slightly faster than similar foods of finer texture, but that when hard particles are present in the food, the discharge is considerably retarded. Very hot or very cold

8. Zeitschrift für Röntgenkunde, vol. xii, 1910.
9. Cannon: Amer. Jour. Physiol., 1898, i, 359.
10. Hedblom and Cannon: Amer. Jour. Med. Sc., cxxxviii, 504.

food does not cause any considerable variation in the normal rate of discharge from the stomach. Food of high acidity takes much longer to leave the stomach than food which is only faintly acid.

The clinical observation that inflammation of the appendix may markedly affect gastric motility and digestion is strengthened and confirmed by these observers.[11] Cats were etherized and under aseptic precautions a few drops of croton oil were injected into the cecum through a small median incision in the abdominal wall. The next day they were fed the standard potato food mixed with bismuth subnitrate and the movements of the food studied with the *x*-ray. In every case the gastric discharge was much slower and the passage of food through the small intestines was greatly retarded. Their conclusion, therefore, seems perfectly justified that irritation of the colon can cause marked retardation in the rate of exit of food from the stomach and in the passage of food through the small intestine. This is interesting in view of the frequent clinical occurrence of gastric disturbances in inflammation of the cecum and appendix.

Kaufmann[12] and Friedenwald[13] have pointed out that cholelithiasis is frequently accompanied by hyperacidity and Friedenwald[14] observes further that any condition that leads to biliary retention may produce this condition. Perigastric and duodenal adhesions may also affect the motor functions of the stomach. Billings[15] says that these are most frequently due to cholecystitis and observations made in the surgical treatment of this condition would seem to confirm his statement. We are at the present beginning to appreciate more and more the importance of the motor functions of the stomach and that its motor and secretory powers, besides being directly related to each other, play a large part in the whole digestive process.

Cause of Relaxation of Pyloric Sphincter.—Cannon[16] has recently emphasized the part that HCl plays in controlling the discharge of food from the stomach into the duodenum. He has shown that the pylorus remains closed until an acid reaction appears in the chyme on the gastric side of the sphincter, whereupon it relaxes and some of the chyme passes into the duodenum. The presence of acid chyme in the duodenum incites the closure of the sphincter and keeps it closed until the pancreatic juice and bile, also caused to flow by the acid contents of duodenum, have neutralized the chyme. When this has occurred the pylorus opens again and more of the gastric contents are expelled. The time of appearance of free HCl in the pyloric end of the stomach has a very important bearing on the time at which the gastric contents begin to pass into the duodenum. Appetite juice appears early and as carbohydrates do not combine with acids, free HCl appears early and carbohydrate food passes out of the stomach within fifteen or twenty minutes.

11. Idem., p. 519.
12. Kaufmann: Amer. Med., 1903, vi, No. 20.
13. Friedenwald: Med. News, July 22, 1905.
14. Osler's Modern Medicine, v, 114.
15. Billings: Amer. Jour. Med. Sc., cxxxiv, 625.
16. Cannon: Amer. Jour. Phys., 1907, xx, 283.

Cannon has shown that proteid food combines with the acid, and free HCl does not appear until later, thirty minutes to one hour. Fats, having an inhibitory effect on the secretion of HCl, take a much longer time, from one to two hours. Thus in hyperchlorhydria, proteids and fats would tend toward prolonged gastric digestion and with less free acid. The slowing of the gastric discharge, he holds, is due not so much to the effect on the pylorus on its gastric side as to the fact that a longer time would be required to neutralize the highly acid chyme in the duodenum.

While we recognize the importance of the various functions of the stomach we must not forget that man can exist without any stomach, as has been shown by the surgeons, and that in cases of achylia gastrica, patients can maintain a fair state of nutrition without any gastric juice at all.

In summing up the evidence in regard to gastric digestion, it is but fair to state that while it is the general opinion of physiologists as well as of experienced clinicians, that the principal work of the stomach is in preparing the food for real digestion in the intestines, still we believe that this is very important and that any departure from its normal functions must and does materially affect the working of the balance of the digestive tract.

Intestinal Digestion.—As the acid chyme is pressed through the pylorus into the duodenum, it is brought into contact with three different juices; the secretion of the pancreas, the bile, and the intestinal juices. Heidenhain and Pawlow have shown that the pancreatic secretion is influenced to a certain degree by nerve fibres from the vagus and splanchnic nerves and have compared it with the secretion of saliva.

According to Pawlow the composition of the juice varies according to the character of the food, the proteolytic ferment being increased by the ingestion of meats, while the amylolytic ferment is increased by a starchy diet.

Following Pawlow, Popielski[17] and Wertheimer[18] have shown that there are other than the nervous factors concerned and that the secretion was present when the acids were introduced into the duodenum, even after all nervous connection had been severed from the pancreas.

Believing more in a chemical than in a nervous mechanism, Bayliss and Starling took up the work at this point and in the Croonian lecture for 1904, "The Chemical Regulation of the Secretory Process," read before the Royal Society of London, they described a special substance, which they called secretin. This substance they claim has a specific action on the pancreas and constitutes the only natural cause of its secretory activity. This they base upon experiments in which an extract made from mucous membrane of the doudenum with HCl was injected into a vein and which brought forth the pancreatic secretion at once. Their explanation being that the HCl as it passes out of the stomach and comes in contact with duodenal cells, liberates a substance, which being absorbed into the general circulation, passes to the pancreas and there stimulates

17. Popielski: Gazette Clinique de Botkin, 1900.
18. Wertheimer: Jour. de Physiologie, iii, 1901.

the secretion of juice. They assert that it is a staple substance, since boiling nor the addition of alkalies to neutralize or even render it alkaline did not affect its activity. It was also productive of a copious secretion when injected into other animals. That it acted independently of the nervous system, was shown by experimenting on dogs, in which all nerve communication had been severed from the duodenum and confining the influence entirely to the blood.

Wertheimer[19] had already shown that irritation of the duodenum by acids affected the pancreatic secretion through the blood, and on account of the general confirmation of these observations by investigators since, it would appear that while the exact chemical nature of secretin has not been determined, the mechanism of secretion of the pancreatic juice has been solved.

It is interesting to note further that the presence of bile being just as necessary as the pancreatic juice in the digestion of foodstuffs in the intestine, the simultaneous secretion of these two juices is provided for by the formation and absorption of secretin. Thus we have in this substance a double function of activating the secretions of both the liver and pancreas. Another instance of the close association of these two important secretions is shown, anatomically, by the close proximity of the openings of these ducts, in many instances both being joined in one. Physiologists tell us that the pancreatic juice itself, as secreted, is very weak in its proteolytic action and that its chief activity is due to a substance called trypsinogen, instead of trypsin, as formerly taught. Here we are again impressed with the wonderful adaptability and dependence of the organs of digestion.

Pawlow and his pupils have shown conclusively that as soon as this juice enters the duodenum, its presence causes a profuse secretion of intestinal juice, which contains an active ferment called enterokinase. This in turn acts upon the trypsinogen of the pancreatic juice and forms the substance called trypsin, which is one of the most active proteolytic ferments known. The statement of Pawlow that, by altering the amount and character of the pancreatic secretion, the organism can adapt itself to the needs of an exclusive proteid or carbohydrate diet, is still an open question. The secretion of bile goes on continuously as does the urine, although it varies in character and amount, depending on the kind of food being digested, meat having the greatest effect and starches the least. This is undoubtedly due to the fact that with a proteid diet the formation of secretin is greater in amount.

The conclusion that bile is an intestinal antiseptic is now known to be incorrect. The marked putrefaction of intestinal contents observed in cases of obstruction of the common duct by stone, acute inflammation or the contraction or pressure of malignant disease, is not due to the lack of bile as an antiseptic but rather to the presence of fat, which readily decomposes and which, had the bile been present to assist the pancreatic juice, would have been digested and absorbed.

19. Wertheimer, C. R.: Soc. de Biologie, 1902, p. 475 (Comptes rendus Transactions).

There is another fallacy which we are slow to give up and that is the giving of medicines to increase the flow of bile. It has been shown repeatedly, both in animals and in human beings, that there is no drug that will increase the total amount of bile in twenty-four hours. Bile acids or bile itself will do this, but nothing else.

The evacuation of the gall-bladder and the discharge of bile during digestion, according to Bruno, are brought about by the effect of the passage of the food from the stomach into the intestine. And since the passage of the chyme into the intestine is governed by the character of food, the discharge of bile is different for the different foods, greater for the proteids and less for the carbohydrates. As yet no secretory nerves have been found for the liver and the inference is that the secretion is controlled entirely by stimuli brought to it by the blood.

CONCLUSIONS

The desire for food or appetite, as we call it, by reason of its being the most powerful excitant of the gastric juice, has a marked influence upon the whole digestive process.

Shakespeare was not far wrong when he had Macbeth, shaking and apprehensive, exclaim to his lady: "Now, good digestion wait on appetite, and health on both!"

In addition to the various psychical elements concerned, appetite is influenced by the physical conditions of the stomach and the needs of the body in general. Any condition of weakness or deficient circulation of blood in the stomach lessens the appetite. Mild condiments to render the food more palatable, together with an atmosphere of good fellowship and cheer, will frequently add to an otherwise indifferent appetite.

Soups or broths made from meat, preceded by some bitter tonic, will greatly assist in forming a zest for food. Thus, by increasing the tone and circulation of the stomach and appetite coming with the eating, a fair meal may be taken. Rapid eating with imperfect mastication, together with physical exercise, worry or mental irritation directly after the meal, may interfere in a marked degree with the motor and secretory functions of the stomach.

Any variation in the acidity of the gastric juice is followed by changes in the secretions of the pancreas and liver, as well as in that of the intestinal juices.

Cohnheim says that the motor function of the stomach is its most important factor in digestion, and we have seen how this is influenced by the character of the gastric contents.

Acute inflammations, perigastric adhesions, disease of the gall-tracts, especially cholecystitis, and diseases of the pancreas, by causing a motor insufficiency of the stomach, may likewise exert a decided influence on digestion. While it is possible to maintain life after the stomach has been entirely removed, it is only by imitating the work of the mouth and stomach in preparing the food for use. And so in a large measure we know that digestion and absorption in the intestine is dependent upon

the normal activities of the stomach. While we speak of gastric and intestinal indigestion, in many cases it is difficult to make a distinction, since sooner or later any departure from the normal function in one part of the digestive tract is followed by derangement in the other parts.

In addition to the special factors that we have mentioned we may say that good digestion depends upon a contented state of mind, restful sleep, fresh air, sunlight, physical exercise and the proper activity of each of the various organs that make up the alimentary tract.

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THE PATHOLOGY OF DIFFUSE SUPPURATIVE PERITONITIS AS AN INDICATION TO ITS TREATMENT

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1. *Anatomical Considerations:*—The peritoneal sac with its multitudinous folds possesses an area equal in extent to that of the skin. The lesser peritoneal cavity communicates with the greater through the foramen of Winslow and as this aperture is readily closed by adhesions the relatively infrequent extension of an inflammation from the greater to the lesser sac is explained. The contact of the parietal and visceral peritoneal layers accounts for the division of the greater cavity into compartments more or less separated from each other. These spaces derive their walls from agglutinations incident to a peritonitis. The mesentery adhering to the parietal peritoneum divides the greater sac into a right and left compartment; the transverse colon tends to create an upper and a lower space; the suspensory ligament of the liver produces a right and left subphrenic recess; and in the female the uterus with its appendages resolves the pelvic cavity into an anterior and posterior pocket.

The tendency to partition the peritoneal cavity during inflammation often limits the infection and confines it to a definite area. In other instances it circumscribes an infection at a point distant from its origin and becomes a dangerous complication.

The elasticity of the peritoneum is evidenced by its ability to cover rapidly growing tumors, to envelop the uterus at term, and again to fit it smoothly in its involuted state. The peritoneum is loosely connected to the organs that it covers and this condition increases its mobility. The elasticity and mobility of the peritoneal membrane enables it to protect itself against infection. A perinephritic abscess will not break through into the peritoneal cavity as long as that membrane is able to recede from the wall of the abscess cavity.

A glance at the arrangement of the peritoneum will show that the pelvic cavity contains a very small portion of the peritoneal area and this accounts for the beneficial results of the Fowler position, as toxic fluids gravitating into the pelvis will of necessity be absorbed very slowly.

The circulation underlying the peritoneum is so great that the distended blood vessels are capable of containing the entire blood in the body.

The peritoneum is dependent upon this feature for its resistance against infection. Meisel and Lennander cite numerous examples of suppurative processes in the walls of intestine and surface of peritoneal covered organs successfully resisted by the peritoneum as long as its blood supply remains intact. Thrombosis and obliteration of the blood vessels tend to a rapid involvement of the peritoneum and this is demonstrated by the greater tendency to perforation in the recurring forms of appendicitis. Meisel relates a case in which a suppurative kidney lesion took eight years to produce a general suppurative peritonitis by perforating the membrane. These examples should be a warning against the expectant treatment of infectious processes in the proximity of the peritoneum.

2. *Functional Considerations:*—Wegner determined that the peritoneum could absorb a quantity of fluid equal to from 3 to 8 per cent. of the body weight in one hour. The rate of absorption depends upon the intravascular tension and possibly also on the rapidity of the current in the blood vessels. Peiser proved this by demonstrating that the rate of absorption through the peritoneal membrane was markedly reduced when salt solution had been previously introduced intravenously, hypodermically, or by the bowel. Inflammation of the peritoneum, according to Peiser's experiments, caused an immediate increase in the absorptive functions, but this quickly subsided and at the end of an hour the rate of absorption was very low. This relative cessation of absorption is explained by Lennander to be due to thrombosis and compression of the lymph vessels, but Peiser has shown that the same inhibition occurs when fluids of an indifferent character, i. e., free from bacteria, are employed. In order to account for diminution of absorption it becomes necessary to assume the occurrence of a state of absorptive equilibrium. Peiser attempted to destroy this stage of equilibrium by injecting 15 c.c. of salt solution into the peritoneal cavity of rabbits that had been infected with colon bacilli one hour previously. In these experiments the injected animals died very rapidly, while the controls remained alive. Flushing the peritoneal cavity with one litre of salt solution one hour after the time of infection with a definite quantity of colon bacilli also killed the animals; the controls remaining alive.

The significance of these experiments was further enhanced by determining the number of colonies of colon bacilli growing from the blood drawn from the common carotid artery, at intervals of one-half hour. The number of colonies increased enormously after the injections and flushings. In these experiments the infectious material was thrown into a peritoneal cavity entirely unprepared for an assault of this kind; a condition which rarely occurs in the human subject except through accident, gunshot, injury, etc., through the sudden rupture of an abscess situated in a peritoneal covered viscus, or through the rapid perforation or rupture of the intestine from other causes. In the greater number of instances that result in peritoneal infection, the leakage of bacteria takes place gradually, causing a reaction of the peritoneum which undoubtedly changes to a marked degree both the rate and character of its absorptive tendency when it receives its large dose of infectious material, such as

would occur from the rupture of a previously inflamed appendix. It is therefore evident that an experiment which is able to mimic the conditions under which peritonitis occurs in the human subject but partially, is only of value in a general way for the purpose of indicating or contra-indicating certain methods of treatment.

This great absorptive power, while protecting the individual from developing peritonitis from mild infections and bacterial leakage up to a certain amount, constitutes one of the greatest dangers to the patient's life when the amount of infectious material is great and its toxicity high. Under such circumstances, if unchecked, it inundates the general system with toxic fluids to an extent which paralyzes resistance and terminates vital functions. It will be seen that it is largely upon our ability to influence the degree and effect of this absorptive power of the peritoneum, that our success or failure in the management of diffuse peritonitis will depend.

3. *Bactericidal Power:*—Noetzel experimenting on rabbits, found that while the intravenous injection of .1 c.c. of a culture of staphylococcus resulted fatally, the animals did not present a single untoward symptom from the introduction of 10 c.c. of the same culture, into the peritoneal cavity. Wherein lies this apparently enormous bactericidal power of the peritoneum? Investigation revealed that the ability of the peritoneal lymph to destroy bacteria did not exceed that of the blood and hence could not account for the phenomenon which finds its explanation in the enormous area of the peritoneal membrane and the manner in which the infectious material is distributed over its extent.

The work of Meisel demonstrated that colored particles introduced into the peritoneal cavity could spread over the entire peritoneal surface in three-quarters of an hour. In other experiments the time required would vary between three and four hours. Intestinal activity and frequent contractions of the diaphragm acted as accelerators of the distributive process. Meisel holds the view that apparently unconnected abscesses in the peritoneal cavity, occurring during the course of or at the termination of a diffuse peritonitis, result from this primary wide-spread distribution of the infectious material, which in some areas disappears through absorption and in others are reacted against by a suppurative process and isolated by the formation of adhesions.

There exists in this distributive function of the peritoneum, influenced in its rapidity by intestinal and diaphragmatic activity, another great differentiating factor in the course and behavior of diffuse peritonitis. An infection spread over the peritoneal membrane gradually will be slowly absorbed and consequently tolerated, while a virulent infection distributed in the time of three-quarters of an hour, of necessity rapidly absorbed, will tend to overcome the systemic resistance and tolerance by the enormity of its dose. The fatality here results from an acceleration of a peritoneal function. In part, this function may also account for the presence or absence of pus reaction in the case of mild infection. An infection of small virulence spread over the peritoneum rapidly and absorbed would not produce a pus reaction in the peritoneal cavity. Pus

would in all probability be produced if the distribution and absorption were delayed and the infectious material allowed to remain sufficiently long in a circumscribed area.

The ability of the peritoneum to limit the migration of an infection and to more or less completely isolate the infected area, consists in the tendency of contiguous peritoneal surfaces to adhere to each other under certain conditions. The usual contiguity of peritoneal folds, increased by intestinal distention and the influence of a certain degree of irritation are the factors concerned in the production of peritoneal agglutinations. Experiment proves the absence of adhesions in very mild infections. From extremely virulent products the tendency to peritoneal agglutinations is likewise wanting. It is quite apparent, therefore, that in order to exhibit its adhesion phenomenon the peritoneum must sustain an infection sufficient in quantity and virulence to excite active peritoneal reaction; but not enough to inhibit and paralyze that faculty.

Adhesions may be either temporary or organic in character; when temporary, they consist of a fibrinous union between two peritoneal surfaces, the peritoneal epithelium of which is intact or capable of reconstructing its integrity. The organic adhesions consist of fibrous tissue beneath which the epithelial cells have been destroyed and little or no tendency exists to reconstruct them. Again, temporary adhesions may change into the organic variety, or they may resolve and disappear altogether, depending upon the severity and continuance of the irritant which resulted in their formation.

It has been observed and noted by many surgeons, that the peritoneal cavity which when observed at the time of an acute inflammatory stage, presented an intricate maze of adhesions, proved upon being opened some years later to be comparatively free from abnormal agglutinations. This fact has given rise to the view that a special tendency exists to re-establish the continuity of the peritoneal cavity, and with this the notion that adhesions might well be left to take care of themselves. Careful observation from a pathologic standpoint, and this is supported by the experiments of Meisel, demonstrates no such particular tendency to free the peritoneal cavity of adhesions, but explains the melting away of agglutinations through the fact that the great bulk of them are of a fibrinous nature and hence prone to dissolve and disappear in a comparatively short time.

The organic variety of adhesions, however, do not spontaneously undergo any change in texture and disappear. They may stretch, elongate, and otherwise change contour, but still continue to exist as fibrous bands of variable length and width, producing difficulties in proportion as they interfere with the motility of organs, and constrict the lumen of intestine. They produce loops and bridges beneath which intestine and omentum may become constricted. It will also be noted that the safety residing in the limiting adhesions of an intra-peritoneal abscess is often very ephemeral in nature, on account of the fibrinous character of the

bands. The literature is teeming with reports of death from sepsis occasioned by the pouring out over the peritoneal surface of the contents of an encapsulated abscess from which the limiting bands were dissolving.

4. *Causes of Infection*:—Infection, generally, and some observers say always, enters the peritoneal cavity from or in connection with the organs covered by the peritoneum. The most frequent source of peritoneal infection is the intestine, specially its appendix vermiformis, which is responsible for about 90 per cent. of the acute inflammations occurring in the peritoneum. The remaining 10 per cent. result from perforation of ulcers in the gastro-intestinal tract, bursting of abscesses in the peritoneal-covered organs or encapsulated pus accumulations within the peritoneum, from direct extension by contiguity or continuity of infection in the peritoneal-covered structures, such as occur through the uterine wall and through the abdominal ostium of the Fallopian tube, and again from traumatic perforating injuries from without as exemplified by a stab wound through the abdominal wall. An injury of that variety might also open the intestinal tube and then present two causes of infection at the same time. The infections in connection with the performance of a surgical procedure by which the abdomen is temporarily opened is really an example of direct inoculation of bacteria; a condition similar in many respects to the infectious processes experimentally produced. Much evidence exists to prove that infection may be carried to the peritoneum by the blood stream. Cases of this form of peritonitis would properly belong to the hematogenic or so-called idiopathic variety of peritoneal infection. The literature is crowded with reports of peritonitis occurring during a pneumonia in which a culture from the peritoneum proved to be that of the pneumococcus. As no direct tract of infection could be demonstrated between the chest and the abdomen at the time of operation, the conclusion becomes inevitable that these instances were examples of a hematogenic variety of infection. Tilton reports a case of diffuse peritonitis during the course of a case of scarlet fever in which the operation failed to demonstrate that the infection came from any of the organs in connection with the peritoneal membrane.

Examination of cultures from the pus taken from cases of peritonitis show an almost unlimited variety of bacteria, among which the colon bacillus, bacillus lactis, the streptococcus pyogenes, the staphylococcus pyogenes aureus, and the varieties of staphylococci are very frequently encountered. From a practical standpoint we have little to do with the particular variety of microbe which infects the peritoneum. We are especially concerned with the amount and virulence of the infection, irrespective of its kind; and with the local and general condition of the individual in whom the process takes place.

Gravitz proved experimentally that the introduction of pyogenic bacteria into the peritoneal cavity did not always set up a peritonitis. Peritonitis did not occur when the number of bacteria was small. A comparatively large quantity was tolerated when the microbes were not suspended in irritating media.

Deve, from experiment and case observation, makes the statement that the normal body fluids, urine and bile, are not capable of producing a peritonitis when accidentally entering the peritoneal cavity. He also holds the view that bacteria, bacterial products, intestinal ferments, and solid particles, cannot, acting singly, set up a peritonitis. While all this may be true theoretically, it is a fact practically that in the production of peritonitis, as it generally occurs, the combination of bacteria and irritating fluids usually exists.

Developing further the cause of peritoneal infection we find occasionally its origin in such obscure conditions as embolism of the mesenteric arteries, phlebitis of the portal system, and umbilical phlebitis. More rarely suppurative processes in the mesenteric and retro-peritoneal glands, suppuration in the abdominal parietes, in the pelvic cellular tissue, in the peri-rectal tissue, in the peri-renal space, and pleural empyema, result in a peritonitis. Nor can we fail to mention that peritonitis now and then owes its origin to the extension of a psoas abscess, caries of the lower ribs and vertebræ, and suppurative osteomyelitis of the pelvic bones.

The ability of the peritoneum to protect itself against outside invasion by means of its elasticity, mobility, and vascular richness, is responsible for its security against infection from these causes, mentioned as being rare and infrequent. But as this security diminishes in direct proportion as the elasticity, mobility, and vascular supply of the peritoneum is reduced by inflammations in its neighborhood, we cannot afford to regard lightly even the rare causes of peritonitis. In connection with surgical procedures interesting the peritoneum Meisel has demonstrated experimentally that dry areas of peritoneal membrane are more susceptible to infection than moist portions. This fact has also been observed by Walthard. If this experiment has value it teaches the abdominal surgeon to keep the exposed peritoneal membrane moist during the operation.

Finally I would mention an origin of peritonitis which has not received attention in the later publications on the subject, viz, a congenital or acquired sacculation of the intestine. The writer has upon two occasions met with this condition as a cause of diffuse peritonitis. A sacculation may occur in the small or large intestine, upon its free or mesenteric surface. It consists of a mucosa-lined sac of variable size, in my cases from that of a pea to a walnut, springing from the wall of the intestine and generally communicating with its lumen by means of a small aperture. It contains fecal matter usually in the form of a hard spherical mass. Several of these saccules may be situated in proximity to each other, communicating with one another or with the intestinal lumen only. In one case a saccule was of walnut size springing from the cecum near the base of the appendix and projecting into the free peritoneal cavity. It contained a hard fecal mass. An orifice leading into the bowel lumen could not be demonstrated but had no doubt existed and become closed incident to the inflammatory process involving the saccule, much in the manner of the obliteration of portions of the appendicular lumen at the time of an appendicitis. The second case presented the formation of three small saccules in close proximity to one another,

originating in the mesenteric border of the ileum and lying between the layers of the mesentery. They contained hard fecal matter and communicated with each other, but apparently had lost their intestinal communication through the inflammatory process.

The various explanations for their existence are not susceptible of proof. That they are of intestinal origin is apparent from the fact that they are lined by intestinal mucosa and contain fecal matter. Consisting of blind extremities, communicating with the intestinal lumen by small apertures, these saccules present in their physical conformation the characteristics of the appendix vermiformis and are consequently prone to the same pathologic processes and present in every way the same dangers to the peritoneal membrane. On account of their size and situation, their presence prior to operation cannot be determined. In the writer's cases the symptoms were those in connection with a case of appendicitis terminating in peritonitis. It therefore behooves an operator to bear in mind the possibility of sacculation that he may deal with the condition in a proper surgical way.

5. *The Character of Peritoneal Reactions:*—W. A. Evans states that every case coming to autopsy shows evidence of bacterial leakage into the peritoneal cavity. Experiments by Wegner, Peiser, and Meisel, and clinical observations by a host of surgeons demonstrate beyond any reasonable doubt that a certain quantity of infection under certain circumstances is tolerated by the peritoneum and disposed of by absorption without any appreciable reaction.

The quantity of infection that may be disposed of in this way is very variable and depends upon a variable array of conditions, viz., an intact peritoneal membrane, the vascular development of the peritoneum, its mobility and elasticity, the extent over which the infection is spread, the rate of the distributive function, the virulence of the infection, the intestinal distention, the bactericidal power of the blood, the power of phagocytosis, the condition of the heart, the capacity of the kidneys; in cumulative language, the local status of the peritoneum, the virulence of the infection, and the status, physical and chemical, of all the tissues and organs of the body as a whole.

It will therefore be plain that the determination of the amount of infection which may be sustained without appreciable reaction can only be estimated in a very general way, if at all. The factors upon which it depends are so numerous and in so many instances impossible to measure.

It is safe to say that one of the reactions of the peritoneum against infection is the absorption of the infectious material, and when that plan reaches a certain maximum an exudation of serum, plasma, leucocytes and blood, takes place into the peritoneal cavity. At times the deposition of fibrin upon the serosa paves the way for the building of adhesions of a temporary or permanent nature.

The exudative reaction of the peritoneum does not differ chemically from that of other structures. On account of the enormous continuous extent of the membrane, the size of the cavity into which the exudate may flow, and the continuous tendency to absorption exhibited by the serosa,

the physical character of the exudate will present marked variations from that usually found in connection with other structures.

The quantity of pus may be very great, several quarts or more, depending upon the space in the abdominal cavity. At times the exudate is more serous in character, and again of a sanguineous nature. The color may be white, yellow, green, yellowish-green, or brown and grayish-brown, depending on the character of the predominating infectious organism. The serosa may be glistening and moist, or it may be covered with fibrin, presenting a grayish dry appearance. In some cases of profound sepsis it is red and dry.

6. *Prognosis:*—Experience in general furnishes a bad prognosis for those cases of peritonitis in which the serosa is dry and red with little or no secretion in the cavity. This particular state is variously explained. Lennander holds the view that absorption has been so rapid and intense as to exceed the rate of exudation, and consequently resulted in an inundation of the system by toxic products. Another explanation lies in the probable absorption of an amount of toxic material sufficient to paralyze the phenomenon of exudation, consequently abolishing the protective function.

No one will deny that the pouring out of a profuse exudate dilutes the toxic fluids and makes for a bacteriolysis, practically outside of the general system. The deposition of fibrin in the serosa, the congestion and stasis in the blood capillaries, and the choking of the lymph channels undoubtedly reduce to a minimum the rate of absorption and thereby tends to save the life of the patient by guarding his system against an overwhelming septic dose.

Lennander from his large experience with peritonitis says that the prognosis is good when the exudate is large. Dubar and Remy noted a small amount of exudate and an absence of fibrinous deposit in fatal cases of infection. Lennander quotes the case of Hultl, a boy aged 5 years, with five liters of pus in the abdomen, finally healed by an operation with drainage.

That the exudate in peritonitis is toxic, and that the degree of toxicity is at times very great, has been conclusively proved by experiment, by clinical observation, and by the accidental infection of the operator. To the rabbit .1 c.c. of the liquid has resulted fatally. Disturbance of the absorptive equilibrium, incident to flushing and traumatizing the peritoneum at the time of operation has resulted in the absorption of a sufficient quantity of the toxic exudate to cause death in a few hours after the procedure, an experience which has also been shared by the writer. This patient was a woman, aged 25 years, who after sustaining a perforation of the uterus incident to the passage of a sound developed a peritonitis. The fifth day after the accident found the patient with a pulse of 90 and a temperature of 1 degree above normal, no particular tenderness in the abdomen, very little distention, some dullness, and constant vomiting and obstipation. At operation the peritoneal cavity contained several pints of a serous exudate. The peritoneum in a part of its extent was covered by a fibrinous exudate, the rest being moist and glistening. It

presented apparently no attempts at adhesion formation. The peritoneum was manipulated considerably in a search for a possible mechanical ileus; some of the fluid was sponged out, and a rubber and gauze drain inserted. The patient recovered from the operative shock but succumbed four hours later with all symptoms of profound sepsis.

That accidental inoculation of the operator's fingers through a scratch or needle puncture has frequently resulted fatally is so well known that it needs no special examples for its proof of existence.

From the evidence at hand it is quite apparent that the exudative function of the peritoneum is a life-saving process, through the fact that it inhibits absorption at a time when the further entrance of toxins and bacteria into the general system would tend to terminate life, also that the exudate dilutes the poisons already generated and that it inhibits bacterial growth and makes for bacteriolysis.

On the other hand the toxic exudate constitutes a grave danger, and especially so in diffuse peritonitis without adhesions. As the peritoneum sheds itself of its fibrinous exudate and as the congestion in its vessels subsides, the absorptive power is re-established, an enormous quantity of septic material suddenly enters the already over-burdened circulation and finishes the tottering patient.

It is the succession of such experiences which has led up to the operative procedure by which the exudate has been removed, or as much of the toxic material as was possible without much disturbance or injury to the peritoneal membrane. By this means the secondary fatal absorption of the toxic exudate, which in the beginning proved a measure of safety to the patient, was prevented.

7. *The Distribution of Toxins and Bacteria:*—Gravitz found that fifteen minutes after the injection of a culture of streptococcus into the peritoneal cavity of a rabbit the germs could be found in the heart, liver, and kidney tissue. Under the conditions that accompany peritonitis in the human subject very few bacteria reach the general blood stream. The toxins enter the hepatic circulation from the peritoneal cavity, pass into the heart through the vena cava, and then into the general blood stream. The complications in peritonitis as reported by Lennander and others are in accord with this assumption. Thrombosis in the portal vein and vena cava, pneumonia and pleuritis, pericarditis, liver atrophy, retroperitoneal abscess and nephritis are complications in the course of peritonitis which map out quite clearly the route over which the toxic products travelled and left their track of injury and devastation.

8. *The Causes of Death:*—Notwithstanding the numerous features in connection with the various cases of peritonitis but one and only one cause of death exists. Clinical observation amply demonstrates that as long as the toxins remain in the peritoneal cavity the patient's life is in no danger. It is due to the passage of the toxic products into the general circulation that all symptoms arise. The septicemia with its effect upon the tissues and organs is alone responsible for the fatal results. The study of the causes of death from peritonitis practically resolves itself into an investigation and consideration of all the factors which increase

and result in such an acceleration of the absorption of septic products through the peritoneal membrane as to overcome systemic resistance and tolerance.

Experimentally, death occurs when the quantity and virulence of the infection produced has been so great that the amount absorbed previously to the inflammatory reaction of the peritoneum has been sufficient to compromise life. We may term such a condition death from primary absorption.

Peiser's experiment with rabbits, which had previously been infected, and after one hour subjected to flushing of the peritoneal cavity with one liter of salt solution, resulted fatally to the animals that were irrigated, while those not so treated remained alive, surviving the infection. These are examples of death from secondary absorption.

Von Genersich reports experiments conducted on fifty rabbits to ascertain the effect of complete intestinal obstruction. After the ligation of the small intestine, many died the first day. The greatest number succumbed on the second day, and only a few survived to the fourth day. Ligature of the large intestine caused death in from two to eight days. Cultures from the peritoneum and blood of these animals produced numerous colonies of colon bacilli. These are examples of death from continuous infection, the bacilli and toxins passing through the intestinal wall into the peritoneal cavity and from there on into the general circulation; or they may also have passed directly into the blood vessels situated in the intestinal wall.

It is more probable, however, that the bacilli and toxins pass through the intestinal wall into the peritoneal cavity, and from there on into blood and lymph vessels, and that this process is dependent upon the thickness of the intestinal wall.

It may be very interesting to note that after performing the same experiment, that of artificially obstructing the lumen of the gut, on dogs and ducks—animals possessing a very thick walled intestine—Genersich came to the conclusion that in those animals the intestine may be ligated without a fatal result, without even causing a peritonitis, providing the tension of the ligature is such that it cuts through the wall of the gut within four days. An examination of these animals conducted two or three weeks after the ligation operation, revealed that the intestinal lumen was re-established with only a slight degree of scar tissue contraction at the site of the former ligature. These experimental results foreshadow the evil effects of a paralytic ileus in connection with peritonitis, and especially point out the danger of the ensuing intestinal distention which invariably accompanies it.

Peiser also found that some of his animals, surviving the primary infection, succumbed later, after two or three weeks, to such affections as large abscesses behind the peritoneum, abscesses in the kidneys, liver, and other organs. These are examples of death from complications resulting from the arrest of bacteria distant to the source of primary infection.

The above described conditions cause death in at least two distinct ways, depending largely upon their location. A large abscess situated

in a comparatively unimportant region may result fatally from the continuous absorption of its toxic products, death from chronic septicopyemia. An abscess or multiple abscess formation involving important organs may cause death by sufficient interfering with or destroying their function, and this occurs especially rapidly when one of the vital organs is involved.

9. *The Clinical Considerations*:—The conditions which underlie the causes of peritonitis in the human subject practically preclude death from primary acute absorption. It is questionable that even the bursting of a large abscess or the sudden discharge of bowel contents from sudden rupture of the gut, would prove fatal from the amount of toxic material absorbed during the first hour or so. By far the vast majority of peritonitis cases result fatally from what experimentally is called secondary absorption, and which corresponds clinically to toxic absorption after the period of peritoneal reaction.

Many deaths follow continuous infection as occasioned by intestinal obstruction and the continuous leakage of infectious material into the peritoneal cavity from a ruptured viscus or intra-abdominal abscess. Secondary absorption and continuous infection not infrequently coexist, and under such conditions death occurs very rapidly with all the signs of profound and acute sepsis. That most of the cases presenting the type, diffuse peritonitis, die in the absence of operative treatment from secondary absorption, from continuous infection, or from a combination of the two conditions, no one who has clinically observed this variety of disease can conscientiously deny.

While the exact percentage of death rate is impossible to determine for obvious reasons, the fact remains that a large number result fatally in the absence of surgical treatment and some authors, from their observation, place the death rate for diffuse septic peritonitis as varying between 90 and 100 per cent. when permitted to run its course without intervention.

A colossal heap of fatal surgical results, from such procedures as eventration, breaking up of plastic adhesions, mopping out all the pus, and flushing of the peritoneal cavity with salt solution, testifies mutely to the baneful results accomplished through the disturbance of the absorptive equilibrium. Trendelenburg, washing out and draining the peritoneal cavity, admits a mortality of 60 per cent. in the treatment of peritonitis.

The literature presents the reports of the autopsy on many cases demonstrating the fatal effects of continuous infection from a perforation of the intestine, through which septic material continuously entered the peritoneal cavity. Lennander, Greenough, Barth, and others, state that cases in their experience, presenting continuous intestinal distention in connection with obstruction, paralytic or otherwise, generally proved fatal in a few days after the establishment of the condition. The great danger of continued intestinal distention has been experienced clinically, demonstrated experimentally, and is negatively supported by the prompt results after relieving the distention by means of a so formidable procedure as an enterostomy. Greenough reports immediate relief of symptoms after

opening the large intestine and permitting the gas and liquid contents to escape through a flanged glass tube. Booth saved eight out of eleven cases which were apparently moribund by relieving the intestinal distention through an enterostomy, the relief in symptoms being immediate.

Examples of death from the complications associated with peritonitis are so common that the perusal of almost any series of fatal cases will reveal a number of them. Death may be delayed after a diffuse peritonitis which cleared up completely after operation, death occurring from an extensive purulent cellulitis behind the peritoneum involving the cellular tissue in the mesentery. Ross reports a case of diffuse peritonitis operated on and apparently doing well but which died on the sixteenth day after operation from broncho-pneumonia. The autopsy revealed a large abscess between the liver and diaphragm which had ruptured into the right pleural cavity and lung. This report and many others of a similar nature are very interesting and highly important from a pathologic and therapeutic standpoint, as they apparently demonstrate that a diffuse peritonitis which at operation shows no effort towards the formation of plastic adhesions may subsequently circumscribe a portion of its infection and give rise to an intra-peritoneal abscess. This pus-filled cavity constitutes a complication which has often been responsible for a fatal issue.

The complication termed septic thrombophlebitis represents an invasion of the circulation apparatus with the special danger of multiple metastatic abscess formation and consequently has an enormous fatality with therapeutic measures very much at a disadvantage.

10. *Suggestions for Treatment:*—The study and consideration of the various features concerned in the inception, course, and termination of acute suppurative peritonitis will furnish at least some hints by which treatment may be conducted more rationally and a lower mortality confidently expected.

The expectant treatment has an appalling mortality and cannot be considered either rational or humane despite the fact of an occasional recovery. The practice of extensive manipulation in the abdominal cavity and the flushing out of it with antiseptic and irritating solutions is followed by a high mortality and should be discontinued. The removal of fluid from the peritoneal cavity should be accomplished as gently as possible by means of wet sponges or a suction apparatus to avoid injuring the serous membrane. Eventration should not be practiced except as a necessary measure to locate an intestinal perforation. Fibrinous adhesions should not be broken up, nor should extensive exploration be made into the free portion of the cavity. The time of operation must be reduced to minutes and not continued over hours. The pus from an abscess cavity must have free drainage to the outside, and perforation of hollow viscera must either be closed or tamponned and packed in such a way as to lead the material issuing from them to the outside, thus protecting the general peritoneal cavity. The abdomen must be opened to relieve the

intra-peritoneal tension as pus under pressure is absorbed at a greater rate. Pus in the free cavity may be allowed to flow out and this is much safer than to attempt to wipe it out.

Drainage through the incision should be provided either by means of glass or rubber tubes or by means of a cigarette drain. Intestinal distention should receive constant attention first, last and all the time. Should the different enemas and cathartics fail to relieve the condition, an enterostomy will be justifiable. Careful search should be made from day to day, for pus collections distant from the source of infection. When found, they should be evacuated.

Salt solution should be continuously employed, preferably per rectum, by the gravity method, or if this proves insufficient the salt solution may be injected subcutaneously or even intravenously. This procedure increases elimination, dilutes the circulation, and increases the intravascular tension. The Fowler position is of undoubted benefit and may be employed as soon as the patient leaves the operating room; a syncope from this cause need not be feared.

Fluids accumulating in the stomach should be removed by the stomach tube, after which the stomach should be washed out. This procedure frequently relieves the distressing retching. Drugs should be used only when demanded by specific symptoms in connection with the vital organs and morphin must certainly be employed with great caution.

103 State Street.

APPARATUS FOR IMPROVED ETHER ANESTHESIA *

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I wish to present and describe the latest form of an anesthesia apparatus which I have been developing for the last four years. An earlier form thereof was presented at the meeting of the American Medical Association in this city during June, 1908, and my paper was published shortly thereafter in the *Journal of A. M. A.*[1] By comparing the illustration therein contained with the present device (Fig. 1) several changes may be noted. I at that time employed a foot bellows to supply the air current required, and a compression bulb to counteract the intermitting quality of the air current supplied by the bellows. In the place of these I have substituted the less expensive and more simple Politzer air bag, of the six-ounce size, provided with an inlet valve in the bag, and have additionally supplied a similar valve in the tube leading therefrom to the anesthetic bottle, in order to prevent any rearward motion of the air, while the hand bag is being expanded. In this way the air current supplied is intermitting instead of constant, and its motion is timed with the patient's inspirations.

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* Presented at a meeting of the Chicago Laryngological and Otological Society, March, 22, 1910.

1. Jour. Amer. Med. Assn., June 20, 1908.

The device is based upon the principle of the Junker inhaler, which was originally designed for chloroform only. As modified it is adapted for the employment of ether. The second or mixing bottle, as suggested by Brophy, prevents the passing to the patient of the fluid anesthetic, as might otherwise occur should the ether bottle be too nearly filled, or should too much force be employed in the supply of air. While the capacity of this bottle is ten ounces I find it best to have it not more than two-thirds filled with the ether. My custom is to have the patient first anesthetized with the mask in the usual manner; when a change is made to the inhaler as the operation is begun. I have selected ether as

Fig. 1.—Ether Anesthesia Apparatus (½ size).

an anesthetic, it being the safest and most convenient to employ in the class of cases for which the described method was designed, being patients semi-asphyxiated from defective respiration, whereby the blood has been overladen with carbon dioxid, and underoxygenated for possibly several years, thereby increasing both the difficulty and the danger of the anesthesia.

In order to assure the safety of all anesthetics oxygen in some form is required. In the case of prolonged nitrous oxid anesthesia, air, for different reasons, cannot be employed, and oxygen gas is of necessity selected. With ether and chloroform a sufficient amount of oxygen can

at all times be secured from the inhaled air, the only requirement being that a lethal dosage of the anesthetic vapor be avoided. When these agents are given from a mask an undesirable amount of the vapor may at any time be unintentionally administered, particularly in the case of chloroform, the vapor of which accumulates through the patient's "holding the breath" until a very dense vapor is inhaled. In the writer's opinion this explains the chief cause of fatalities occurring at the beginning of chloroform anesthesia, the dense vapor being absorbed and carried directly to the heart by the pulmonary veins so as to cause cardiac failure. In fact this is probably the chief, if not only way, in which circulatory disturbance precedes respiratory failure during anesthesia. This theory was advanced by the writer several years ago.[2]

The bottles are of large size and different shape from those I formerly employed, and are supplied with a specially made screw-cap with dome elevation to better permit of the application of the proper connections. As will be seen the bottles are of the wide mouth variety and a style was selected with a liberal and prominent screw thread. The air tube in the ether bottle terminates in a three-pointed extension, so as to divide up the entering air, and cause its better exposure to the ether. By operating the lever on the top of the ether bottle, which swings 180 degrees, the passing air current may be more or less subject to the effect of the ether as required. In this way by proper attention to the circulation and respiration the correct degree of anesthesia can easily be maintained. Furthermore interrupted administration, which is one of the chief disadvantages of mask during surgical work in the mouth or throat, is avoided, as well as the feature of rebreathing, which is so generally associated with the use of the cone or mask. Additionally the anesthetist is at no time in the way of the operator.

In the second bottle, which was formerly employed as only a safety or mixing chamber, I have been enabled, owing to the wide mouth, to introduce a smaller metal screw cap bottle for the use of chloroform, which can thus be added to the etherized air current if at any time required. By slightly compressing the small connecting rubber ball, the air above the chloroform is condensed so as to force outward into the larger bottle a few drops thereof through the escape tube. At all other times the etherized air passes about this bottle without absorption of the chloroform. From the mixing bottle a rubber tube leads to the patient which is supplied with a Y-shaped tip, with conical hard rubber plugs, so as to tightly fit into the patient's anterior nares. In order to meet the requirements of different ages, from infancy to maturity, I have found that four sizes of these tips are required.[3]

Cold is produced by ether at the time of its evaporation, or transition from fluid to vapor and one of the disadvantages of the mask comes through such chilling of the air inhaled, and as at this time mouth breathing is chiefly employed, the lungs are exposed to very cold air, which is additionally not humified as should be. In this way post-operative bronchitis or pneumonia are often caused. With this device the

2. The Medical Monograph, February, 1899.
3. The Jour. of Ophth. and Oto-Laryn., January, 1909.

evaporation occurs in the anesthetic bottle, some distance from the patient, who thus escapes the exposure to cold, for by the time the etherized air reaches the nose the frigidity is materially reduced. Furthermore, as all of the etherized air is compelled to pass through the nose, it is both warmed and humified by the physiologic action thereof, before reaching the lungs.

In order to care for the increased salivation, caused by the ether, and also for the hemorrhage incidental to the operation, aspiration is employed. In this way the operative field is not only kept fully exposed but there is also avoided the danger of respiratory arrest from the entrance of

Fig. 2.—Blood Aspirator (½ size).

fluids into the lung tubes, and therefore the further danger of aspiration pneumonia. Furthermore, as the passage of ether-saturated fluids to the stomach is prevented, the danger of post-operative vomiting is diminished. As a further assistance in the avoidance of vomiting I have found a two day's course of preparation to be of great value, and I furnish the patient with a printed sheet of directions regarding the same. When these directions have been accurately followed no vomiting has been observed.

In the aspiration device the same style of bottle is used as is employed in the inhaler (Fig. 2). Being wide-mouthed the blood is easily

emptied. With the smaller necked bottle formerly employed some trouble was experienced, as marked coagulation of the blood is caused by its being so churned with the air exhaust.

A fourth or reserve bottle goes with the set to supply the loss in event of an accident breakage. The extra space it requires in the hand bag is of no disadvantage as, being wide mouthed, it serves as a container for any small instruments or pieces carried. It is also provided with a screw cap and extra rubber washer.

The aspiration device is supported from the neck of the assistant by a tape, who, while holding down the tongue with a depressor in his left hand, after the mouth gag has been adjusted, has in his right hand the aspiration tip, and from time to time, as required, enters it in the back part of the patient's mouth for the withdrawal of fluids, a nurse meantime operating the suction pump. A quick beginning, followed by a strong, steady pull, gives the best results. In this way blood and saliva are carried to the receiving bottle, which should be emptied, providing it becomes more than two-thirds filled. For lubricating the piston of the air-pump I have found that a mixture of equal parts of glycerin and water is better than oil, as it does not dry out so quickly. M'Mechan, of Cincinnati, has recently written of the use of this aspirator in general surgical work, and has particularly mentioned its value for the removal of regurgitated fluid from the mouth, which so frequently occurs during intestinal obstruction.[4]

As compared with the earlier pattern some changes have been made in the aspiration tip, the point of which has been surrounded with a cage of perforated metal, while at its end there is provided a large conical opening for small blood clots, of similar shape to those formerly employed. Care is taken that there is no reduction in calibre at any point in the connections or tube leading to the receiving bottle. With this change is avoided the former tendency of the uvula to be drawn into one of the two holes with which the tip was provided, while the many holes in the perforated metal insure against stoppage by tissue shreds or blood coagula. Furthermore, with the present form the cage end can be easily unscrewed and removed for cleaning.

During the entire operation for the removal of both tonsils and adenoids the patient is in the Rose position, being therefore in the same relative position to the operator as during routine office work, which gives an advantage, as through changes in position the landmarks may become confused. Furthermore, as the larynx is thus elevated above the plane of the pharynx, blood collecting about the entrance to the postnasal space can be easily removed, and therefore the tendency for it to be either drawn into the lung tubes or swallowed is greatly reduced. Lastly the intermitting passage of etherized air through the nose tends to prevent the retention of blood in the postnasal space. These two devices, as described, have been made for me by F. A. Hardy & Co., of Chicago.

103 State Street.

4. The Lancet-Clinic, Jan. 29, 1910.

SCOPE AND CHARACTER OF THE NEXT UNITED STATES PHARMACOPEIA *

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Ever since the eighth revision of the United States Pharmacopeia made its appearance in 1905 the individual physician and medical organizations, and the individual pharmacist and pharmaceutical societies have discussed what the ninth revision should be. With the appointment of the Committee of Revision it may be said that the skirmishing is at an end, and that the interested parties are in alignment to decide the scope and character of the ninth revision of the book. It would seem opportune at this time to present to the medical profession a brief statement as to what, from the standpoint of the retail pharmacist, the ninth revision of the Pharmacopeia should be.

In the main, two conditions have brought about a difference of opinion between the physician and the pharmacist. Physicians, particularly those who are interested in the advance of rational therapeutics, desire that the remedies contained in the Pharmacopeia be such that they may limit their prescribing to the articles contained in the book, and that inclusion in the Pharmacopeia shall, in a measure at least, indicate therapeutic value. So also, teachers of materia medica and therapeutics desire that the scope of the Pharmacopeia be such that they may use it as a text and so insure its use by the graduate physician. The pharmacist, on the other hand, particularly since the enactment of the Pure Food and Drugs Act, desires that the Pharmacopeia shall protect the public as well as himself, and that it shall be a book of standards which he may safely follow. He desires that the scope of the book and the subject matter shall be such as to enable him to determine and guarantee the good quality of the largest possible number of drugs. In order that physicians may be conversant with the wants and needs of pharmacists a brief outline of some of the principles which the pharmaceutical profession desires shall govern in the revision of the Pharmacopeia are presented.

The pharmacist holds that any remedy which is in general use as a remedial agent should, unless otherwise objectionable, be admitted to the Pharmacopeia, and that admission to or deletion from the Pharmacopeia should not be considered as an indication of the therapeutic value of the drug.

Since, through the enactment of the Pure Food and Drugs Act, the Pharmacopeia has become more directly a legal standard, those whose function it is to determine the quality of drugs desire that the language of the Pharmacopeia should be plain and unmistakable. In line with this, it is demanded that the next revision be compiled with much greater care than was the last. The following are some of the more specific suggestions for the improvement of the book along these lines:

* Read at the meeting of the Chicago Medical Society, May 25, 1910.

Besides specifying the objectionable impurities, the present Pharmacopeia contains a statement of the amount of real substance which should be contained in a given article. Thus, for Epsom salt, besides excluding objectionable impurities such as metallic salts, arsenic, etc., the Pharmacopeia directs that this salt should contain 99.7 per cent. of real magnesium sulphate. Pharmacists have found this so-called "purity rubric" of great value and desire it to be continued and extended. The descriptions of many crude drugs need careful revision so as to provide means of insuring a high grade drug. As to-day many vegetable drugs reach the pharmacist in a comminuted or powdered form, it is necessary that the official description provide means for the recognition of the drug in such condition. That is, while formerly it was sufficient if the external characteristics of the plant yielding the drug were described, such description is insufficient to-day. It is now necessary that the microscopic characteristics of many drugs be carefully described. Methods of chemical assay of drugs, such as the determination of morphin content in opium, have proved eminently satisfactory and the pharmacist desires that, whenever possible, chemical methods of assay be given for each drug. Experience has shown that in many cases the active constituents of a plant are confined to certain tissues. In view of this, it is now fully appreciated that a custom, sometimes followed in the past, of grinding a drug and then separating a portion thereof by means of sieves, to be sold as powdered drug while the part remaining on the sieve might be sold for other purposes, is incorrect as it is possible that the fine portion may or may not contain the active medicinal ingredients of the drug. Therefore, it is desirable that in the next Pharmacopeia definite directions for the powdering of drugs be given and a limit of residue for rejection be stated. In the present Pharmacopeia no description of the finished products, such as fluidextracts, tinctures, etc., is given when methods for their preparation are provided. In view of the changing conditions in retail pharmacy it is desired that standards for such galenical preparations be provided wherever possible.

Considerable difference of opinion has been expressed whether the Pharmacopeia should simply indicate the degree of purity required for a given drug or whether also the method whereby this purity may be determined shall be included. A large majority, I believe, desire that the Pharmacopeia shall include definite and precise descriptions of the methods to be used in the examination of drugs. Since this will add materially to the size of the book, the opinion has been quite generally expressed that such methods for the determination of physical and chemical constants be placed in an appendix to the Pharmacopeia. If this plan be favorably considered by the Revision Committee it will probably be feasible to make arrangements so that physicians could buy copies of the book without the appendix. Many products, besides being used as medicines, are also used for technical purposes. In order that the pharmacist may not be required to dispense the costly official hydrochloric acid when the acid is required for technical use only, it is desirable that the Pharmacopeia should point out very plainly that its standards are to be applied only when the articles designated are to be used as medicines.

The pharmacist is most anxious that, besides the doses now included in the Pharmacopeia, also the maximum single and the maximum daily dose of potent remedies be given. From the standpoint of the pharmacist, such statement of maximum doses is desirable. It will enable the pharmacist to consult physicians when large doses of drugs are given without fear of giving offense. At the present time the pharmacist often is in a quandary when large doses are prescribed. If his estimate be correct that the dose is excessive, dispensing of the prescription may endanger the life of the patient, while consultation with the physician often entails the animosity of the latter, even if the pharmacist were correct in his belief that an excessive dose had been prescribed. Inclusion of such maximum doses is very much to be desired if the medical profession can see its way clear towards the formulation of doses which physicians may not exceed unless they be indicated by a characteristic sign.

The pharmacist believes that the chemical nomenclature of the Pharmacopeia is, in a general way, satisfactory and that great conservatism should be used in modification of names. He believes that the names of synthetics should be abbreviations of their true chemical names and that they should be short and euphonious. Under the wording of the Pure Food and Drugs Act the pharmacopeial standards apply to an article only when the article is sold under its pharmacopeial title. There being a tendency to sell drugs under unofficial, but nevertheless well known titles, so as to escape the provisions of the law, it is desirable that the list of synonyms in the Pharmacopeia be extended, that is, for instance, that thorn-apple be given as a synonym for stramonium.

It having been shown that some drugs and pharmaceutical preparations rapidly deteriorate, it is desired that the next Pharmacopeia give directions for the proper keeping of drugs and that it establish a time limit for drugs which are prone to deteriorate. The need of such a time limit has been shown for the fluidextracts of coca, aconite root and physostigma, for the solid extract of physostigma, and particularly for preparations of the suprarenal gland.

Because of the great harm which may be done through lack of precautions in the sterilization of certain prescriptions, it is recommended that a chapter on sterilization be included in the next Pharmacopeia. This chapter shall give directions for the particular methods of sterilization adapted to the various classes of preparations.

A very large majority of the pharmacists are satisfied that metric weights should continue to be used in the Pharmacopeia to the exclusion of the old system, and exception to be made only in the statement of doses which it is believed should continue to be given in the old, as well as in the metric system.

From this it appears that pharmacists want an extended Pharmacopeia since they believe that they can guarantee the purity and quality of drugs only if such drugs are recognized by the Pharmacopeia and their purity and quality described. Physicians, on the other hand, want a

book which they may use, and therefore desire it limited to articles of therapeutic value. They believe that the federal authorities are quite able to control the quality of drugs whether such drugs are described in the Pharmacopeia or not.

DYSMENORRHEA*

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Mr. President and Gentlemen: In selecting dysmenorrhea as the subject for my paper this evening I thought it would be of interest, since the condition is so commonly met with in general practice, and is one about the etiology and pathology of which there is such a diversity of opinion. I thought that by discussing it from an entirely practical standpoint you might gain something of value. The direct causation of the pain is, I believe, due to the following factors: 1. Hyperesthesia and spasm of the internal os uteri. 2. Clot formation within the uterine cavity. 3. Uterine contractions. I will try and show you that these conditions are always present in those women who suffer during menstruation, and demonstrate that the conditions found on examination, whether intra- or extrauterine, cause dysmenorrhea by increasing one or all of these factors. The diagnosis is ordinarily easy, yet many mistakes have been made, and it is to be remembered that the congestion present just before or during menstruation often causes pain in an adherent appendix. Urethral caruncle, hemorrhoids, cystitis—the pain of which may closely resemble dysmenorrhea—abortions, miscarriages, dermoids and extrauterine pregnancy are conditions at times responsible for error in diagnosis; the latter after rupture, when we have colicky pains and discharge of clots, is so like dysmenorrhea that it could easily mislead the hasty observer. My remarks are especially confined to the pains related closely to the uterus and its appendages and do not relate to the many reflex symptoms so common during the menstrual flow, such as headache, backache, irregular heart and kidney action, dysuria, hot flashes, hysteria, etc. The pain is almost invariably intermittent, and when it is described as being continuous, I believe it is due to the uterine contractions overlapping, giving a sensation of a continuous spasm. Its location is usually central, at times over one or both ovaries, shooting down the inside of the thighs or out onto the iliac crest. It is variously described as labor-like, as colicky, bearing down or dragging; some say it is stabbing, boring or neuralgic; the colored women describe it as they do pain elsewhere as "misery." The past history will help us in determining whether or not the pain is dysmenorrhea, not only as to the menstrual suffering, but the patient's general history, especial attention being given to scarlet fever, malaria, rheumatism, heart-diseases, phthisis, gonorrhea, and syphilis, all of which are indirect causes of menstrual discomforts. The subject is so divided as to make six types of dysmenorrhea, but at

* Read before the Knox County Medical Society, Galesburg, Ill., April 21, 1910.

this classification is not satisfactory, and to present to you a more plausible explanation of the condition is the purpose of my paper. The divisions are: 1. inflammatory; 2. spasmodic; 3. neuralgic; 4. mechanical or obstructive; 5. membranous, and 6. ovarian. These are not only confusing but open to serious objections. 1. The inflammatory type confines us to those cases in which there is some inflammatory condition of the uterus or its appendages and does not explain why some of these patients feel better while menstruating than between their periods. As a rule the women who would be placed in this class suffer most several days previous to the flow from an increase of blood to organs already inflamed. Inflammation in no way accounts for the colicky intermittent pain just before or during the flow after the subsidence of the backache and heavy feeling in the pelvis. Again there are many women with even pyosalpinx and ovarian abscess, who do not have the slightest pain while menstruating. 2. The spasmodic theory implies that the pain is due to the uterine contractions alone, and those advancing the theory confess that these cases may suffer from attacks of pain independent of menstruation, which pain could hardly be classed dysmenorrheal. Granting that there may be a spasmodic type it is hard to understand why all women do not have dysmenorrhea, as the contractions, I believe, are always present. 3. The class of cases coming under the head of neuralgic dysmenorrhea are those in women who suffer from rheumatism, gout, or malaria. Usually anemic, of a highly susceptible nervous temperament and often hysterical, the fact that some of these patients, though by no means all have painful menstruations does not, to my mind, explain the direct cause of their suffering. 4. The mechanical or obstructive theory is especially applied to cases in which, from some congenital defect or acquired condition, as atresia or flexion, the menstrual secretion is impeded. When we stop to think that about five or six ounces of blood are lost at each menstrual period, and taking five days as an average duration with only one drop of blood escaping every three minutes, it is hard to see how there could be much suffering in a canal which is at least three-sixteenths of an inch in diameter, unless there is at some point in this canal a spot that is hyperesthetic to pressure. There are many women with cervical stenosis, interstitial fibroids, extreme flexions, etc., who have menorrhagia or metrorrhagia, and yet who do not suffer, although the cervical canal will admit only the finest probe. 5. The membranous theory does not account for those cases in which membranes are passed without pain nor why there is suffering only at intervals of two, three or four periods. 6. What I have already said in regard to the inflammatory type may be applied to the ovarian: i. e., that many women who have ovarian trouble do not have painful menstruation. Allow me to repeat that the theories ascribing painful menstruation, to inflammation, spasm of the uterus, neuralgia, mechanical obstruction, passage of membranes, or ovarian diseases, and, as I have already said, uterine contractions alone will not account for the pain as they occur when it is not present. To determine definitely the etiology of dysmenorrhea it is necessary to collect the data of past experience, and with that to begin a

new series of deductions which will point to causes that can be shown to be always operative. It is well known that in a certain number of cases in which a sound is passed there is marked pain; sometimes, in fact, the pain is so severe that the sound can only be passed while the patient is under the influence of an anesthetic, and without such an aid even a fine probe could be passed with difficulty. This is obviously due to a temporary contraction, caused by an introduction of a foreign body or the sensitive fibers of the internal os, which is the smallest and most sensitive spot in the uterine canal and is surrounded by a circular band of muscular fibers forming a so-called sphincter. Increase the sensitiveness of this normally sensitive point and a spasm occurs when it is irritated. It is evident then that pain may be caused by a spasm of the internal os. It is a fact moreover that the passage of a sound has cured patients suffering from dysmenorrhea. It is only reasonable to suppose that in such cases the pain (since pain can be so caused) was due to spasm of the internal os, not due to mechanical obstruction, as many women whose cervical canals present such obstruction do not suffer pain. In so far as an obstruction causes retention of blood, and therefore favors clotting, does it seem to be a factor in dysmenorrhea. If we have clots of blood in the uterine cavity which eventually have to be passed, we can readily see how the hyperesthetic os, which is normally only about three-sixteenths of an inch in diameter, may be thrown into a spasm and cause pain. As a matter of fact most, if not all, women who suffer during menstruation pass clots at this time. Patients will tell you that pain brings clots away. Any foreign body in the uterus will cause it to contract. During pregnancy we have, after three months, the Braxton-Hicks sign; a fibroid especially in the uterine wall will cause contractions, as will intrauterine injections and applications or any object such as a small bit of cotton tampon, etc. It seems only natural to infer that the retained menstrual blood, especially when clotted, will give rise to contractions, which cause the intermittent pain like that occurring in dysmenorrhea. I have questioned 100 women who have suffered during menstruation and 97 of these said clots pass during this time; some of them are very small and it seems possible that at times the acid secretions from the vagina may dissolve the clots which come from the uterine cavity, as it is well known that blood taken as it appears at the internal os will coagulate as any blood taken from any other part of the body, but the menstrual blood, as ordinarily seen, does not do so on account of its admixture with the acid secretions of the vagina. The women's general condition has at times close relation to their suffering. They frequently tell you that they suffer more when they are run down, overworked, nervous, or worried. I have had the opportunity of watching several patients who passed membranes when menstruating and they had pain only when their general health was poor. As a rule these pieces of membrane, some as large as half a dollar, were passed without the slightest inconvenience. This form of dysmenorrhea is the most rebellious to treatment and frequently the only assured cure we can offer these women is the menopause or ovariotomy. In regard to treatment the patient's general condition should receive its full share, as I feel con-

fident that I have seen the menstrual suffering, if not entirely cured at least much lessened by the building up of the general rundown system. Should she be anemic, iron and the syrup of hypophosphites seem to be very satisfactory with my patients. Blaud's pills, five grains each, with one-tenth grain of extract nux vomica, three to six pills daily can usually be relied upon. The salicylates and quinin seem, at times, to act beneficially but to what extent I am unable to say, as the relief from pain was as great in these women who had not rheumatic or malarial diathesis as in those who had. The bowels should be carefully looked after, the salines perhaps acting better as they seem to relieve the congestion which is present, quicker than other laxatives. One important part of the treatment is rest; I mean rest in bed two or three days previous to the expected flow, also during this time. Vaginal injection of hot water at 100° to 110° F. will of itself at times lessen the suffering. Used twice daily up to the day previous to the expected flow and recommenced a few days after the flow has ceased, this will be found of the greatest benefit. The failure in some cases to procure any relief from hot douches—and this applies to all vaginal injections no matter what the indications may be—is due to the women not knowing how to use them properly. They should always use a bulb syringe with a nozzle made of horn or some other non-conductor of heat, although a metal tip may be covered with a piece of indiarubber tubing, and inject at least two quarts with or without medication. These injections should always be taken while lying down, which is awkward for a women to do herself and is one reason why they sit over a basin or commode, and why many are not benefited by douches. They should always be given by some one other than the patient. A fountain does little more than bathe the vagina in a puddle of warm water, especially if the patient is upright and what we want more is the relief of the congestion in the pelvic vessels, which is produced much more quickly by the impulse of the jet of water from a bulb syringe, which excites the vessels to contraction. At times women will complain of weight and discomfort in the pelvis after these douches. In these cases by reducing the temperature to about 95° F. they can be well borne. When there is much congestion present in the pelvis and whenever we find tenderness the application of iodin, first removing the mucus by means of forceps dressed with cotton and followed by introduction of glycerin tampons, will benefit greatly. These applications should be made twice weekly so long as marked tenderness exists as ascertained by the finger. The bromids will help many of these cases used between the periods in small doses and then increase the dose two or three days previous to the flow. In patients in whom there is intense suffering with scanty or suppressed flow, usually seen in young girls, the same treatment may be used as aborting a coryza.

Morphin should not be used unless absolutely necessary, and then only hypodermically, and it should always be given by a physician. The acceptance of this theory will demonstrate at once when general treatment fails that the proper procedure is a dilatation of the cervical canal; one in which the internal os is not only stretched, but some of its circular fibers torn, a procedure much like that carried out for fissure of the

anus. It may be just possible that a fissure may exist at the internal os uteri in some of these women suffering from dysmenorrhea. It is natural to suppose that the benefits derived, are brought about by relief of spasm at the internal os, which allows a free escape of blood, thereby preventing clot formation, which lessens uterine contractions. I do not wish it to be understood that I advise dilatation in all cases of dysmenorrhea, but the gratifying results obtained in selected cases make it a procedure of much value; by selected cases I mean those in which there is no acute tubal or ovarian diseases, or chronic pelvic trouble in which we find much tenderness on vaginal examination or lacerated cervix. Now the failure to procure relief after dilatation is in many cases due to the fact that the dilatation is not carried far enough. In virgins and in those cases of rigid pinhole os it should be at least three-quarters of an inch and in parous women one and one-quarter inches. This may seem extreme to some, yet experience in my own cases and the results obtained by others have convinced me of its safety and efficiency. If the dilatation is done under an anesthetic, extra care as to cleanliness may be taken. The operation may be done quickly, taking ten to fifteen minutes to reach this dilatation, using only the pressure of one hand. The dilator may be allowed to remain in the canal ten to fifteen minutes or longer, so that there need be little fear of harm, although at times shock will follow even the slightest dilatations of the extrauterine canal. The best time for dilatation is about one week after the menstrual period, the woman remaining in bed at least five days or, should there be pelvic pain, until this has subsided. Finally when all other remedies fail and the woman is unable to stand the monthly sufferings, the question of ovariotomy must be carefully considered.

THE COMPENSATION FEATURE OF THE "PLAN" OF THE EMPLOYERS' LIABILITY COMMISSION

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A study of the situation developed at the recent public sessions of the Illinois Employers' Liability Commission justifies the fear that, if the commission attaches at the present time a compensation feature to its employers' liability law, one of three things will happen: (1) the feature will swamp the law; (2) it will be eliminated by the legislature; (3) it will be so emasculated in committee as to lose all force and identity by the time it becomes any part of the statute.

To certain timely, yet radical features necessary to the thorough-going liability law already long overdue, there can be little reasonable public opposition—any obstacles will have to be manipulated surreptitiously within the legislative committee room. But a compulsory or even optional scheme of compensation for industrial injuries, the hint toward which was added to Governor Deneen's instruction to prepare a law modifying

the defenses against liability for negligence, is a different project, not ripe and easily blighted.

Strangely enough, although the proposed plan calls upon the employer to concede much and yields him scant return, the warmest support of the compensation feature at the public conferences came from employers, the bitterest opposition from the Chicago Federation of Labor. As to the reason for this unexpected support from the employer, there is more to say anon. For the opposition from local labor groups, the legal indirection and ambiguity both in method and wording of the plan seem chiefly responsible if we leave out of consideration a certain natural bumptiousness characterizing the occasional representative of labor—and measurably justify those who voice the sentiments of workers in suspecting that, in labyrinthine phrases, their constituents are to be "traded out of their legal rights." A close study of the plan does not clear up the suspicion that the ambiguity is not unintentional. For, shorn of those features which should be isolated in no uncertain terms within a liability act, the proposed legal groundwork for the schedule of compensation is a curiously unconvincing although speciously worded mixture, reflecting hasty compromise between none too harmonious elements within the commission.

To encourage acceptance of the plan—an optional one, "compulsory in form but elective in fact," whatever that means—certain supposed advantages are proffered to the master on the one hand and to the servant on the other, conditional on acceptance of the prescribed terms. Thus the whilom antagonists are to voluntarily eat together out of the hands of the commission, without too close scrutiny of the process by which they have bargained each other out of their traditional rights. Assuming both parties to this altruistic bartering to be blind to their obvious interests, we still may fairly ask, by what legislative power can the right to recognize defenses be exchanged for concessions, the acceptance of which is optional with a second party? It may be conceded to be good law to declare any pleading invalid which is against public policy; on such grounds the state can rightly go back to first principles by enacting a limit to the employer's judge-made defenses for negligence. But to make the validity of such defenses conditional on an attitude of one or the other party toward a prescribed process of settlement is a form of legislative *double entendre* hardly likely to find favor in constitutional courts. In a word, measures of such widely different intent as those affecting liability for injuries and a schedule of rates for their compensation can hardly be played against each other and cannot be brought safely within the compass of any one act. During the short life allowed it under the creating order, the commission can show a practical opportunism best by elaborating a bill to modify, in the most equitable manner possible, the common-law liability defenses of the employer. No one questions the constitutional right of our legislature to enact such a measure, and—we have the word of John Fitzpatrick* for it—labor will keep after that elusive body "until such a law is enacted for Illinois if it takes twenty years."

*President Chicago Federation of Labor.

The Illinois plan provides for voluntary compensation, "regardless of negligence or fault," thus waiving the employers' present common-law defenses. But if he refuses to compensate, he is still to lose the most valuable of those defenses. Truly, over whichever way the Illinois employer is presently to betake himself, he will find it beset with thorns. On the one hand he may see himself providing liberal voluntary compensation even for trade injuries for which no court could ever force him to pay; on the other he sees his defenses in case of liability reduced to the citadel of comparative negligence. He may comfort himself also with the cheerful certainty that his legal brothers will look to it that no employe "with a good case" accepts any of the poor fare offered at the compensation table. For any presumption that the workman, seriously injured through someone's negligence, "will voluntarily accept the compensation law" provided he has the option, through lack of mandate or contract, of resorting to a more remunerative process, is sheer folly and presumes a lack of thrift, not to say intelligence, scarcely conspicuous in the American mechanic. No employer, therefore, would elect to place himself thus doubly in the hands of chance unless driven into a corner by the unpleasant alternative of a liability act. It is the mandatory element in the foreign laws which has brought about the success attending their operation, and even under an optional plan justice demands that a mandate should coincidently bind both parties who choose to adopt it. It is manifestly unfair toward and unsafe for the employer to ask him to presume, without contract at the time of employment, that his workman will later accept a compensation schedule for all injury. This important point—evaded in the Illinois plan—is recognized and guarded in the New York law of May 24, 1910, which authorizes a written agreement to pay and accept a prescribed compensation for all injuries except for those sustained through an employer's gross negligence or in violation of law. The employer is thus legally empowered to hire only such men as will agree to waive their common-law rights in consideration of a fixed and certain compensation for all occupational injuries.

Should the statute permit or require these written agreements, it should also specify that no other contract for release from claims for injuries shall be valid, unless showing a consideration in accordance with the schedule of compensation.

The plan wisely provides that the workman, if he brings suit and is defeated, is barred from any benefits which might have accrued to him under its terms. Thus is avoided part—but a part only, as just shown—of the unjust double liability incidental to the operation of the English law.

And what are these terms? The plan follows English and French measures in ignoring mutual insurance, in placing the entire burden upon the master without contributions from the employe, and in making 50 per cent. of the daily wage the unit upon which to calculate compensation for disability. Three years' full wage paid as a lump sum is the maximum death compensation, and, as in the New York statutes, not to exceed $3,000. The maximum duration of disability pensions is eight

years. In two important features American measures differ from foreign prototypes—in fixing a maximum of eight years to the time during which benefits are to be paid, and in the avoidance of pensions to survivors. All European laws provide permanent pensions for permanent disability and to dependent survivors. The English act, however, concedes to the employer that he may, after six months, discharge his burden by buying a state pension equal to 75 per cent. of the half-pay allowance. It is a curious fact, showing that the public is not yet educated up to the finer differences in compensation measures, that in the recent public hearings in Chicago there was no discussion of this question of the time limit of pensions. The same is true of the questionable wisdom of providing for lump sum settlements at the employe's option.

Three very important points are ignored in the commission's plan, the introduction of which will add large incentives toward its adoption by employers and a very perceptible increase in the net return to the worker: 1. A provision similar to those in the English and New York acts, by which lump sums shall be paid only into a tribunal to be disbursed by it after a scrutiny of all charges, and with the same power as a probate or bankruptcy court to pass on attorneys' fees. Contingent contracts to pay percentages out of compensation should be illegal, or subject to revision by the judicial body. 2. The plan provides for settlements by "agreement or arbitration, and for confirmation by a court of proper jurisdiction." This follows the New York statute, but the Illinois plan ingenuously fails to suggest the inevitable sequence by adding—"or by an action at law." The commission would avoid separate tribunals for these cases, and trusts that most of them will be settled out of court. It is humanly probable that the method would as frequently as heretofore strand both master and servant high and dry amidst the expenses, delay and befuddlement of the Superior Court. A study of foreign compensation law shows that where the motion is smoothest the operation of the law is placed in the hands of separate tribunals working under permanent bureaus concerned solely with adjustment of industrial claims. In England and France the working out of the principle through ordinary courts has not given the best results. In Germany, Austria, Hungary, Norway, Holland, Sweden and Denmark compensation is segregated within an insurance bureau, and industry is provided with a direct, simple, inexpensive, speedy, just and automatic method of settling its difficulties. Boards of arbitration and award of similar purpose, but with technic modified to meet American constitutions, are suggested in the Wisconsin and Minnesota plans. The Illinois plan will hardly reach an effective maturity without the aid of some such central bureau and tribunal. 3. The insurance of employers against loss through accident compensation should not be prohibited, and mutual insurance by which the workman may increase his disability allowance should be encouraged. But there should be statutory provision, especially applicable to adjustments through insurance companies, making it obligatory to fill out duplicates of release. Such releases should specify the kind and duration of disability, wages earned, amount paid in settlement, to whom and by whom actually paid,

and should be filed for record with the bureau. There should be a penalty for falsifying or failing to record these receipts. Suitable extracts from the statute, designed to enlighten the workingman as to his rights, should be printed as a part of the form of every receipt.

An analysis of recent public discussions before the Illinois liability commission yields the following summary of the situation: 1. Many employers, although opposed to any scheme imposing dual liability, are reasonably willing to accept a compensation scheme based on mutual consent at the time of employment, which would provide their workmen with surer and larger benefits than they would receive either under present methods or under a liability act. It is evident that employers fear the increase in size and number of individual judgments likely to reach them under a liability act, and would prefer either to have the law remain unaltered or to escape the uncertainties of changed liability by conceding at once a scheme of compensation not based on negligence. The general adoption of such a scheme would cause an immediate increase in insurance rates and the consumer would eventually pay the bill—and a little more. This would hardly be the case under the selective and punitive operation of an employers' liability act, and accounts for the otherwise surprising willingness of some employers to accept the alternative of a compensation plan. 2. That Illinois labor is suspicious of any project favored by the employer, and would prefer to move slowly along English lines, first invalidating old common-law defenses by an employers' liability act before proceeding to educate itself as to the terms of a compensation schedule. The attitude taken by labor is justified by past experiences, and is strengthened by the plea of its leaders that they want protection against injuries more than compensation. In the effort toward prevention a liability law, penalizing the individually negligent employer, would furnish a more effective stimulus than would a compensation act. The latter would justify the manufacturer in a general boost of prices under the plea that he must lighten his insurance load. 3. Under immediate conditions the benefits of any Illinois law embodying the principle of optional compensation will be illusory. The fact that New York recently passed a compensation law and has it now in operation is encouraging for Illinois and for every other state; but New York several years ago took the necessary preliminary step in the enactment of an employers' liability act. If our commission does not wish to see its labors go for naught in an Illinois legislature, and suffer another and less equitably disposed body to take up the work, it will prepare such a liability law as will both justly meet the present cry against industrial negligence and lay a foundation for a future compensation act.

ILLINOIS MEDICAL JOURNAL

THE OFFICIAL ORGAN OF THE ILLINOIS STATE MEDICAL SOCIETY

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OCTOBER, 1910

THE ILLINOIS STATE BOARD OF HEALTH AND THE CARNEGIE FOUNDATION.

The last Bulletin of the Illinois State Board of Health, dated June, 1910, and appearing September, 1910, as usual several months late, is largely devoted to a characteristic consideration of the report of the Carnegie Foundation, which it will be remembered had some well directed criticisms of the conditions existing in Illinois, and the responsibility of the acting board in connection therewith. In this bulletin there is conclusive evidence that the board, instead of recognizing the widespread demand for an improvement of conditions existing in Chicago, is prepared to perpetuate them and indelibly blacken Illinois as the rotten spot of the world in medical education. The JOURNAL has in the past months devoted so much space to the consideration of the remarkable attitude of the acting secretary, that our readers who want to know the facts have had ample opportunity to get them. It seems almost useless for us to devote further space to the piling up of further proof of the disgraceful state of affairs, and the JOURNAL would not now sacrifice its columns for this purpose, were it not that some might suppose it had withdrawn its opposition to the further existence of the board as now constituted. Furthermore,

the remarkable series of charges which have been filed in the last sixty days against the agents of the board in Chicago, demand some attention. Although these charges have been made by parties who are little worthy of consideration, yet the character of the charges, and the number of persons making them, certainly have been sufficient to raise a dense cloud of suspicion as to the honesty of the board. The fact is, that even though the board may be innocent of the charges made against them, it has so lost prestige in the minds of the profession and the people of the state, that its opportunity for usefulness in the future has disappeared. In this connection we will quote the remarks of Dr. F. P. Norbury, at Detroit, in his presidential address before the Mississippi Valley Medical Society.

Dr. Norbury was for a number of years a member of the Committee on Medical Education of the Illinois State Medical Society, and therefore speaks of what he personally knows. We commend his statement to all honest members of the medical profession in the state. It would seem that the members of the State Medical Society should rise as one man and demand the removal of the board, responsible for the disgrace of the state:

A MEDICAL EDUCATIONAL PROBLEM

"The unselfish work of the physicians and educators who are endeavoring to bring order out of chaos in the realms of medical education, are, I believe, consistent in their mission; and while their work is unappreciated by the unthinking or biased critics, yet to me their work is the entering wedge which has already cleaved asunder old traditions, and inaugurated vastly improved facilities, standards and higher ideals in medical education. In the discussions which have taken place during this campaign, the critics somehow have lost sight of the fundamental facts that medical education is but a part of the educational propaganda of this century, the evidences of which can be seen in the discussions of all scientific and educational associations of to-day. For several years past it has been my privilege, as chairman of the Committee on Medical Education of the Illinois State Medical Society, to be in touch with this great campaign—this world movement—of which the proceedings of the Council on Medical Education of the American Medical Association and the constructive work of the Carnegie Foundation for the Advancement of Teaching are but very virile integral parts. This world movement has incorporated in it a well-planned, impartial, constructive analysis of the problems of education, and seeks their solution by the most permanent but practical methods. Medical education is undergoing evolution, and the good ship so long burdened with traditions ('the ballast which impedes the dynamics of our modern generation') has had to lighten herself of these burdens in order to keep time and in line with true progress. Medical education has made progress, this progress being based on the fundamental factors of all educational progress: First, the integration of the educational system; second, the standardizing of undergraduate work, prerequisite to professional courses (the general or preparatory education); third, the standardizing of the professional courses, as based on the requirements of modern professional courses in medicine.

"To the Council on Medical Education of the A. M. A. has been entrusted this very important duty, especially the survey of the field establishing criteria for the classifying of medical colleges (which criteria, by the way, are both liberal and elastic), and formulating standards upon which is based the educational advancement now a living reality—a gain in our national educational assets. The work of the Council has been steadily winning more and more the confidence of the sceptical and the critical. It is dealing with problems belonging to the science of education and yet essentially integral parts of the advancement of the science of medicine.

"Within the past year an endorsement of the effective efforts of the Council of the A. M. A. has come from an entirely independent but creative source of notable widening and forceful influence in the educational world, in the Flexner Report of the Carnegie Foundation for the Advancement of Teaching. This report has sounded a war cry for medical culture, for refinement in medical education, for higher ideals, for improved service, and all efforts which through educational possibilities will put the science of medicine where it truly belongs—a leading force in world-wide betterment of the supreme needs of mankind.

"The criticism excited by this report, the antagonism which it has created, and the blatant, boastful redress demanded of Flexner for telling the truth as he sees it as an expert in the science of education, is but another evidence of the primitive social standards which yet prevail in this, our boasted civilization. Somehow, the Middle West, my own state, Illinois, in particular, seems to think that medical education along high standard requirements is a luxury, and should be looked upon as such. In other words, they would put medical education on such a low standard basis that it would be a common commodity. 'Commodities of modern life cease to be considered as luxuries as soon as they become easily accessible to everybody.' Modern medical education is not a common commodity, neither a luxury; it is a necessity, a very living necessity. It must subscribe to the requirements which high social standards of to-day proclaim, seeking as they do, what is best for the welfare of mankind both in sickness and in health."

Right along this line we commend the following editorial items from the *Journal of the Indiana State Medical Society*:

"Illinois physicians have every reason to feel disgraced over the report of the Carnegie Foundation concerning medical education in Illinois and the enforcement of the medical practice laws by the Illinois State Board of Health. Even Louisville, for many years known as the medical diploma mill of the country, does not come in for such a scoring as the following, taken from the report:

"The city of Chicago is, in respect to medical education, the plague spot of the country. The state law is fairly adequate, for it empowers the board of health to establish a standard of preliminary education, laboratory equipment and clinical facilities, thus fixing the conditions which shall entitle a school to be considered reputable. In pursuance of these powers the board has made the four-year high school or its equivalent the

basis and has enumerated the essentials of the medical course, including, among other things, clinical instruction through two annual terms.

"With the indubitable connivance of the state board these provisions are and have long been flagrantly violated. Of the fourteen undergraduate medical schools above described the majority exist and prepare candidates for the Illinois state board examinations in unmistakable contravention of the law and the state board rules. These schools are as follows: (1) Chicago College of Medicine and Surgery (Valparaiso University); (2) Hahnemann Medical College; (3) Hering Medical College; (4) Illinois Medical College; (5) Bennett Medical College; (6) Physio-Medical College of Medicine and Surgery; (7) Jenner Medical College; (8) National Medical College; (9) Littlejohn College of Osteopathy. Of these only one, the National Medical University, has been deprived of 'good standing' by the state board. Without exception a large proportion of their attendance offers for admission an 'equivalent,' which is not an equivalent in any sense whatsoever; it is, nevertheless, accepted without question by the state board, though the statute explicitly states that it can exact an equivalent by 'satisfactory' examination. In the case of the night schools, for instance, one or two years' requirements are satisfied by 'coaching' one night a week in each of the several subjects; one evening is devoted to Latin, the next to English, the next to mathematics. There is absolutely no guarantee that the candidate accepted on the equivalent basis has had an education even remotely resembling the high school training which the Illinois law intends as the minimum upon which it will recognize a candidate for the physician's license. If the state board should—as in duty bound—publicly brand these schools as 'not in good standing,' by reason of their failure to require a suitable preliminary education of their students, their graduates would be immediately excluded from practice in Illinois; adjoining states would rapidly follow suit, with the result that the schools would shortly be exterminated. Fortunately the case against them does not rest alone on the question of entrance requirements, for not a single one of the schools mentioned furnishes clinical opportunities in proper abundance, and some of them even fail to provide the stipulated training in other branches; e. g., anatomy. An efficient and intelligent administration of the law would thus reduce, in short order, the medical schools of Chicago to three—Rush, Northwestern and the College of Physicians and Surgeons."

The report further says that the College of Physicians and Surgeons and the medical department of Northwestern University should greatly strengthen their laboratory instructions, and these two colleges, together with Rush, should strengthen their clinical instruction.

The question now arises: Will the diploma mills of Chicago be closed up or raise their standard so that they can be classed as at least creditable, and will the Illinois State Board of Health, which has been criminally lax in the matter of the enforcement of the medical practice act, assist in the cleaning-up process?

Following close after the report of the Carnegie Foundation concerning the low standard and general inefficiency of some of the Chicago

medical colleges come exposures by Chicago daily papers concerning the manner in which many medical students have obtained their credentials for entrance to medical schools. It seems to be conclusively proved that any person, whether possessing educational qualifications or not, has been able to buy a certificate, signed by a principal of a high school, stating that the owner is duly qualified in educational requirements to enter medical colleges demanding a high school education as a requirement for admission. This exposure, together with the evidence which warranted the Carnegie Foundation in intimating that certain Chicago medical colleges are associated with the State Board of Health in fraudulently turning out and licensing doctors, shows that the whole system of medical education and licensure in Illinois is rotten and that it is time for a house-cleaning.

It is reported that the governor of Illinois, when asked to remove the secretary of the State Board of Health for inefficiency and questionable practices, said that it was not politic for him to do so because the secretary had too much influence with members of the legislature. If the daily papers of Chicago keep up the editorially pungent criticism of the political system which permits the existence of a traffic in medical diplomas and high school certificates it may be possible that the governor of Illinois will find it politic to change his attitude. At all events, Chicago should wipe out of existence the medical diploma mills, and one of the first steps in the purification process is to secure a new State Board of Health.

CAMPAIGN FOR LEGISLATORS

We call attention to the letter in this issue from Dr. L. H. A. Nickerson, of Quincy, detailing his campaign undertaken at the Thirty-sixth district, which resulted so satisfactorily to the profession. It will be remembered Mr. Groves gave the physicians of that district the right to believe that he would stand with them during the last session, in opposing objectionable bills. This he failed to do, and his defeat is the result of his mendacity. Although this is in opposition of the fact, Mr. Groves had a good record in the legislature in most every other regard.

THE MADISON COUNTY DOCTOR.

The Madison County Medical Society, the indomitable secretary of which is Dr. E. W. Fiegenbaum, of Edwardsville, commenced July 1, 1910, the publication of a four-page monthly pamphlet, devoted to the interest of that active society. It goes without saying that with Dr. Fiegenbaum as editor each issue of the pamphlet makes good reading, and if any respectable member of the profession in Madison County escapes membership in that society we would like to see his photograph. A few years ago Madison County was supposed to be entirely intractable to

organization but it appears now to have one of the most active societies in the state.

The example of the Chicago Medical Society, the McLean, and the Madison, in issuing bulletins might be followed profitably by several other large counties in the state.

ILLINOIS STATE MEDICAL SOCIETY.

List of Lecturers of the Bureau of Lecturers.

E. W. Weis, Secretary.

SURGERY.

Dr. Daniel Eisendrath	Chicago
Dr. V. D. Lespinasse	Chicago
Dr. John B. Murphy	Chicago
Dr. E. J. Senn	Chicago
Dr. M. L. Harris	Chicago
Dr. Cassius D. Rogers	Chicago
Dr. A. E. Halstead	Chicago
Dr. F. A. Besley	Chicago
Dr. William Hessert	Chicago
Dr. E. Wyllys Andrews	Chicago
Dr. J. L. Wiggins	East St. Louis
Dr. George W. Cole	St. Louis, Mo.
Dr. Willard Bartlett	St. Louis, Mo.
Dr. Francis Reder	St. Louis, Mo.
Dr. Carl E. Black	Jacksonville
Dr. E. Mammen	Bloomington
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Dr. S. C. Stremmel	Macomb
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OBSTETRICS.

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Dr. Carey Culbertson	Chicago
Dr. Hugo Ehrenfest	St. Louis, Mo.

GENITO-URINARY.

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Dr. Albert E. Taussig.....St. Louis, Mo.
Dr. E. H. Butterfield.....Ottawa, Ill.
Dr. C. W. Lillie.....East St. Louis

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Dr. F. Gurney Stubbs..... Chicago
Dr. John R. Fletcher..... Chicago
Dr. C. M. Robertson..... Chicago
Dr. W. E. Sauer.....St. Louis, Mo.
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Dr. E. W. Weis..... Ottawa

PUBLIC HEALTH AND PREVENTIVE MEDICINE.

Dr. Henry B. Hemenway..... Evanston, Ill.

THE GOVERNMENT BEGINS THE PROSECUTION OF THE PATENT MEDICINE FRAUDS.

The final test of the power of the United States government to punish patent medicine manufacturers is being put to the test in Washington at this time. The country seems to have fully aroused to the magnitude of this evil, and unless the powerful interests have more influence than they, the doom of the nostrum in America seems to be at hand. The following copy of an editorial which appeared in the Chicago *Tribune* of September 24, stating the conditions from the standpoint of the laity in excellent language, should give encouragement to medical men in their warfare against these and the proprietaries.

PUT A STOP TO THEIR LIES

Suits are about to be begun at Washington under the pure food law against the manufacturers of certain patent medicines. The charge will be that they promise impossibilities in order to sell their wares, and thus are seeking to get money under false pretenses. Some of these audacious traders on human credulity say that their nostrums will cure all diseases. Everybody ought to know that that must be a lie, but there are simpletons who do not. Other manufacturers allege that their compounds will cure certain ailments which, as medical men know, cannot be cured by the drugs used. The malady may indeed be aggravated by them.

The men whose industry, so profitable to themselves and so hurtful to the public, is to be attacked have a defense in readiness. It is that it is not unlawful to lie as regards the effects of their remedies. All that they are obliged to do, they will allege, is to specify the ingredients. They hope this plea will be strong enough to enable them to continue to defraud credulous invalids through assurances of a "sure cure" at so much per bottle or dozen bottles.

If the trade of these arrant deceivers can be broken up as far as interstate business is concerned, much will be gained, and if the states shall follow suit still more. There are lies which no law can prohibit and no court punish, but that patent medicine lying which imperils life and health cannot be classed among the venal falsehoods.

The alleged right of a patent medicine man to make money by promising a cure when there can be no cure cannot be admitted. It is plain cheating and should be stopped. If the contemplated suits shall put out of business men who have made their living by fraud, so much the better for the community.

THE TROPICS AS A HEALTH RESORT.

We are just in receipt of the annual report of the Bureau of Health of the Philippine Islands, dated July 26, 1909. It contains a great deal of interest to the physician and sanitarian, on life in the far-away Island Possessions of the United States. Owing to our limited space it is impossible to note many of these items, but the remarks of the commissioners on health in the tropics is so different from that which has been held for many centuries, that we can not refrain from calling attention to it. From this it appears that individuals seeking longevity will fly to the tropics, instead of avoiding them as in the past. Observe the tribute paid to vaccination and pure water and the advice to avoid alcohol.

HEALTH IN THE TROPICS.

As each year's experience is added to that which went before, it is becoming more and more evident that those who observe a few simple rules can maintain good health in the tropics with more certainty than is possible in a temperate climate.

The diseases which occur most frequently in temperate climates, such as pneumonia, rheumatism, diphtheria, and scarlet fever, are the ones for which the prophylaxis is not well known, while the more common diseases in the tropics, like dysentery, hookworm, and malaria, are the ones for which the prophylaxis is well known. The following simple rules which are issued by this Bureau, if faithfully observed, will practically insure anyone from contracting the last-mentioned diseases:

1. Be vaccinated to-day. The Bureau of Health will do it free of charge.

2. Never drink any water unless it has been either boiled or distilled, nor eat any raw vegetables. If you observe this rule carefully you will probably never contract dysentery, typhoid fever, cholera, or any other disease that originates in the intestines. Disregard of this rule is responsible for the returning to the United States of over 50 per cent. of the invalids who leave these islands.

3. Fruit is wholesome and may generally be eaten raw with impunity, provided it is of a kind that grows upon trees, well above ground.

4. Avoid patent medicines. "Do not put drugs of which you know nothing into bodies of which you know less."

5. Alcoholic stimulants are not necessary, the advice of the "old resident," to the contrary notwithstanding.

6. Generally disease carrying mosquitoes fly only at night; therefore always sleep under a good mosquito net.

7. Otherwise observe the same hygienic rules that are applicable to temperate climates, including physical exercise.

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Correspondence

JOINT MEETING OF THE ADAMS, PIKE, CALHOUN AND SCOTT COUNTIES LEGISLATIVE COMMITTEE

QUINCY, ILL., Sept. 24, 1910.

GEORGE N. KREIDER, M.D.,
Editor ILLINOIS MEDICAL JOURNAL, Springfield, Ill.

My Dear Doctor:—Your letter of the 21st received. At the last session of the Legislature, the Hon. Jacob Groves led the physicians to believe that he would vote against the osteopathic and other objectionable bills.

Charles E. Bolin was non-committal; they both voted for these bills. Their action not meeting with the approval of the profession, led them to consider some plan to defeat them for renomination. A joint legislative committee, comprising Adams, Pike, Scott and Calhoun counties, was organized with a view of leaving them both at home. The committee accomplished a part of what they set out to do. We did not elect both of our men, but taught the defeated candidates a lesson that will not soon be forgotten. We were handicapped in having both of our candidates for the Legislature from Adams, which could not well be avoided, as Hon. Sylvester Allen of Scott County came out late in the canvass after we had laid our plans. There is no doubt that Mr. Allen would have been endorsed by the committee if he had entered the field earlier.

Our main object was to scalp the Hon. Jacob Groves, who had played double and was very obnoxious to the profession of Adams County. We took enough votes away from Mr. Groves to give the nomination to Messrs. Charles E. Bolin and William H. Hoffman. We divided our votes between Hoffman and Hawkins. The profession is to be congratulated in securing two good men to represent them at Springfield, both of whom are favorable to higher medical education.

We understand that in the midst of the canvass, Mr. Charles E. Bolin, of Pike County, stated that he had made a mistake in the last session of the Legislature in voting for the Osteopathic Bill, and that in the future he would be found acting with us.

If it is thought advisable, will be glad to write a paper, to be read at the next meeting of the State Society, detailing our work and give the reasons why we actively entered the political arena with a view of defeating the Hon. Jacob Groves, who was serving his fourth term, and the Hon. Charles E. Bolin, who was serving his second term in the Illinois Legislature.

Ours, the Thirty-sixth Senatorial District, is overwhelmingly Democratic, hence it was necessary to defeat them in the nomination.

You are at liberty to publish this letter in the JOURNAL, or may use it as a basis for an editorial.

The joint legislative committee are under special obligation to our state secretary, E. W. Weis; Carl E. Black, of the judicial council, and

L. C. Taylor, of the legislative committee, for timely and valuable letters written to each member of this district during this medico-political campaign. We believe we have made good.

Yours truly,

L. H. A. NICKERSON,
Chairman Executive Committee.

DR. LEMEN DENIES STATEMENT.

ST. LOUIS, MO., Sept. 15, 1910.

To the Editor:—I wish you would state in your JOURNAL that I am not connected with the American Medical College of St. Louis. The inclusion of my name in the announcement of that college was done without my authority or knowledge. I do not believe we are in need of any more colleges, and consequently I would not aid in building up another. I resigned from a good college because I desired freedom in a medical way, and I would certainly not connect myself with another medical college.

Yours truly,

J. R. LEMEN.

A PIONEER DOCTOR.

Moore, Dr. Edmund, deceased, a pioneer physician and surgeon of Morgan County, was born in Elphin, County Roscommon, Ireland, May 26, 1798, a son of Lewis and Ellen Lockwood Moore. The paternal ancestry of the family is Scotch-Irish. Dr. Moore's mother was a descendant of the historic Shannon family, and had two brothers who attained great distinction in British military and naval affairs. One of these, a lieutenant under Nelson, commanded a ship at the battle of the Nile, and also fought at the battle of Copenhagen and at Trafalgar, where Nelson was killed. He died at the Soldiers' Home at Greenwich. Another brother, who became a general in the British army, was in the East India service for many years, and died while in the East, the husband of an East Indian princess.

When Edmund Moore was an infant in arms, his parents came to the United States, locating temporarily at Frankfort, Ky. Soon afterward they removed to Florida, then a Spanish colony, and subsequently to Louisiana, then under French dominion, remaining about five years in the two provinces. Returning to Bloomfield, Nelson County, Ky., the elder Moore took up a tract of land and spent the remainder of his life there. There Edmund Moore was also reared and educated. After reading medicine under the supervision of Dr. Bemis, at Bardstown, Ky., and attending lectures at Louisville, he began practice under a state license at Rockport, Ind., remaining there until his removal to Morgan County, Ill., in 1827. Here he was examined and licensed by the State of Illinois. Upon arriving in Morgan County he purchased a tract of land located about one mile east of the farm now owned by George W. Moore, his son,

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erected a cabin, and occupied that place about six years, practicing his profession and improving his farm. In 1833 he located on Section 29 of the same township, where he spent the balance of his life, dying there May 29, 1877.

Dr. Moore was a splendid specimen of manhood, mentally and physically. He typified the "doctor of the old school," immortalized by Ian MacLaren, the Scotch novelist; for, during the half century of his residence in Morgan County, he was called upon to perform a vast amount of professional work for which he expected and received no remuneration. His practice necessitated very extensive rides throughout the surrounding country, and his trips to relieve suffering humanity were frequently attended by great personal risk, through exposure to the elements in a wild and sparsely settled country. Most of his early practice was accomplished on horseback, with the old-fashioned saddlebags. For many years there were no other physicians in his neighborhood, and it was not infrequently the case that he was called to ride as far south as Edwardsville. Many of his rides covered a distance of sixty miles or more from his home. He became an acknowledged expert in the diagnosis and treatment of the fevers and other diseases peculiar to the Illinois and Mississippi valleys. During the Black Hawk War he was surgeon of the Third Regiment of Illinois troops, which rendezvoused but was not called into active service. During the War of 1812 he had endeavored to enlist for the service under General Harrison in the Canadian campaign, but was not accepted on account of his delicate health.

Dr. Moore was well acquainted with Abraham Lincoln as a boy and man. While practicing his profession in Spencer County, Ind., he was frequently called upon to attend the Lincoln family, but lost sight of the future President after his own removal to Morgan County. After Lincoln's election to Congress, the two men met one day on the streets of Jacksonville, when the former, extending his hand to Dr. Moore, asked him if he did not remember his former patient. The Doctor finally recognized him and in later years reverted to the incident with feelings of great pleasure.

Though deeply interested in public matters, the only office which Dr. Moore ever consented to fill was that of township treasurer of school funds. A whig in early life, he became a republican upon the founding of that party, voting for John C. Fremont for the presidency.

A romantic incident of the Revolutionary period is related by George W. Moore, and is here preserved for the first time in print. During an engagement between the British and Colonial troops near the home of the Cotton and the O'Neal families in Fairfax County, Va., a British soldier who had received a serious bullet wound in the abdomen dragged himself to the Cotton home and asked for a drink of milk. This was furnished to him by Mrs. Cotton, who invited the sufferer into the house that he might receive the care and treatment necessary to his recovery. The milk that he drank passed from his digestive organs through the wound, soothing it and eventually curing him. He remained at the Cotton home, and ultimately transferred his allegiance to the Patriot cause.

MOL

COUNTY AND DISTRICT SOCIETIES.

CARROLL COUNTY

The Carroll County Medical Society met in the Carnegie Library at Mt. Carroll, Tuesday, May 10. There were present Drs. Nathason, Colehour, Clay, McPherson, Mirshow, McGrath, Hendricks, Schreiter, Powers, Overholser, Rice, Metcalf, Johnson, Rinedollar, Packard, and Dr. J. H. Stealy of Freeport. The program which was of unusual interest was as follows: Dr. J. D. Overholser, Milledgeville, "Malignant Edema;" Dr. J. B. Schreiter, Savanna, "The Relation of the Coroner to the Physician;" Dr. J. L. Nathason, Chadwick, "Cerebral Hemorrhage;" Dr. J. H. Stealy, Freeport, "Rehearsal and Differentiation of Acute Abdominal Diseases."

Dr. Stealy, Councilor of District No. 1, read a fine paper. He assisted in the discussions and added not a little to the interest of the meeting. The Society voted to hold its September meeting in Savanna, Ill.

H. S. METCALF. Secretary.

The Carroll County Medical Society met in the City Hall at Savanna, September 6. After a business session the following program was carried out:

Dr. Wm. H. Perry, Sterling, "Diagnosis of Abdominal Pain;" Dr. J. F. Percy, Galesburg, "The Relative Influence of Law, Religion and Medicine on the Human Race;" Dr. G. E. Mershon, Mt. Carroll, "Report of the Meeting of the American Medical Association;" Dr. Alexander Gray, Savanna, "The Hygiene of Infancy and Childhood;" Dr. C. M. McPherson, Hazelhurst, "Report of the Meeting of the Illinois State Medical Society;" "Everybody Report an Interesting Case."

Reports of interesting cases proved of value, especially Dr. Colehour's experience with antitoxin in a malignant case of diphtheria. Dr. Colehour said: "On the 10th of August, I was called to see a case of sore throat. On examination I found a membrane on the right tonsil and a portion of the pharyngeal vault. As the patient had been ill three days, I did not think much of the case being serious but gave immediately 10.000 units of antitoxin. The temperature was 102, pulse 80, and very good. In about ten hours I called again and found the membrane extended to both tonsils, and covering the posterior pharyngeal wall. The membrane was very dark in color and the patient was spitting a great deal of bloody mucus. It was with difficulty that I examined the throat, owing to edema. Albumin was present in the urine in considerable quantity. I immediately gave another 10.000 units and left him fairly comfortable, although now he was unable to swallow even liquids. In about six hours I was hurriedly called and informed that the patient was suffocating and that he had to be fanned; his respiration was through the mouth. I gave in a large sterile glass syringe 25.000 units of antitoxin. I was unable to examine the throat for swelling of the neck, but the membrane being very dark was visible on the uvula and in front of it. The cervical glands on the right side were greatly swollen and extended beyond the angle of the jaw; the sterno-cleido mastoid muscle was swollen nearly to the nipple. The patient showed some signs of cyanosis. Pulse was 60, temperature 101.5. He was restless and delirious. I returned in four hours and found no improvement, but the swelling had extended and included the posterior glands and both sterno-cleido-mastoid muscles. Cyanosis increased. As I was fully aware by this time that I had to act quickly, that I had a malignant case of diphtheria to contend with, I gave the patient 20.000 units of antitoxin, and then 10.000 units every four hours. I had given nearly 100.000 in all before I had the case under control. The patient made an uneventful recovery."

Dr. Perry's paper on "Diagnosis of Abdominal Pain" was a valuable study of the subject. Following is a résumé of the paper:

1. Varieties of Pain. (1) Colics, caused by stenotic processes, and they generally radiate. (2) Shooting or migratory pains; are neuralgic or hysterical. (3) Cutting, sharp or sticking pains involve inflammations of serous surfaces. (4) Gnawing or boring pains involve mucous membranes and parenchymatous organs.

2. Factors modifying pain, according to Dr. Rudolph Schmidt of Vienna: (1) Position; there being a position of maximum pain. (2) motion; pain increased, especially when organs of motion are involved. (3) Pressure; pain increased by high blood pressure, or by direct palpation or through inflation of hollow viscera. (4) Food and drugs; food may allay pain, or increase pain till vomiting. Local anesthetics, as cocain, or anesthesia will allay pain of gastric disease in fifteen or twenty minutes. (5) Organic function; modifies pain, as during defecation, respiration, menstruation, vomiting, etc.

3. Symptoms of severe pain: (1) Dilated pupils. (2) Fast heart and respiration. (3) Abdominal rigidity. (4) Shock. (5) Passage of a large amount of limpid urine.

A systematic examination of the abdominal region for causes of pain will necessitate an examination of the various systems of organs included therein.

1. Causes arising in the abdominal walls, or organs of motion, include lesions of the spine or pelvis, hernias at the usual sites, or from ventral gaps, suppuration intramuscular, or of the deep iliac lymph nodes, perivesical or perirenal, cryptorchism, psoas abscess, etc.

2. Causes arising in the digestive system, including the gall bladder and ducts, call for the consideration of gastric and duodenal ulcer, cancer, or perforation, gastralgias, pyloric stenosis benign or malignant; lesions of the pancreas; intestinal ulceration, strangulation or incarceration, malignancy; appendicitis, intussusception volvulus; lead colic, intoxications, diseases of the liver substance, capsule, or stenosis of the gall-bladder ducts, etc.

3. Urinary system includes lesions of the kidney substance, as nephritis, tumor, tuberculosis, pyelonephrosis, renal infarct, stenosis of the pelvis and ureter; inflammation of the bladder, or tumor.

4. Pelvis lesions to be considered are ectopic gestation, twisted tumor pedicle, tubal infection, malpositions of the uterus, peritonitis and tumors.

4. Conclusions: (1) Abdominal pain is the commonest symptom and is usually early. (2) It should not be checked before its cause is known. (3) Careful physical examination should be made to corroborate by anatomical findings the subjective sensation of the patient.

At the morning session Dr. J. F. Percy of Galesburg read a very interesting address on "The Relative Influence of Law, Religion and Medicine on the Human Race."

The paper was heartily appreciated.

THE RELATIVE INFLUENCE OF LAW, RELIGION AND MEDICINE ON THE HUMAN RACE

J. F. Percy, M.D., Galesburg

Any great department of human endeavor can be judged only from the basis of what its leaders have accomplished. From the leaders, the rank and file get their impulse for good or evil, and these again sway the mass in such a way that their acts become the essence of human conduct. The purpose of my paper is to show, as far as I may, what the three so-called learned professions have done, through their leaders, toward helping man in his onward progress toward obtaining the best possible form of health, happiness and justice.

The memory of man, which we call history when it is written, tells us that medicine started where law and religion began. In the beginning it had the same superstition, the same ignorance, and the same inadequate comprehension of its real mission that law and religion had. To-day, law and religion still hold to their

primitive foundations, while medicine, in all of its history, has made of its past steps that have led it upward among the peaks where sorrow, pain and anguish cannot endure. The three departments of human effort under discussion, all spring from the same source, viz., the human family. To discuss them in the way of comparison, is therefore much like carrying coals to Newcastle.

Man has continuously contended with his environment, even when he himself was responsible for his surroundings. Man, to-day, is contending with his laws and his religions. Why? Because they are not what he wants. He has too much of one, and not enough of the other. He did this for centuries with medicine. He finally learned that when it was a part of religion, it was out of place, and he found this to be true also when he removed it from among the barbers. Man found a place for medicine at last in the sciences, and after he placed it there, it has gone with leaps and bounds as the most beneficent, altruistic representative of human success in the world to-day. Law and religion will finally be placed among the sciences also; but till they are, they cannot hope to compete with medicine as a science in its present comfort-giving assistance in the progress of the race.

Established religion and our present application of law are in a final struggle for existence. Law, with its ages of opportunity, has never made good the undying golden rule. Religion has lived and flourished in superstition and bigotry has been its chief by-product. When it was kept down by tyranny and oppression, when it was deprived of its place as a political power, it showed its greatest strength, and did its most beneficent work. Medicine makes its errors of to-day make more sure the science of to-morrow. Organized religion has always feared science when it could not control it.

Eighty-six per cent. of the present members of our National Congress are lawyers. But in spite of this immense advantage, with all the prestige that it gives, our legal practitioners do not meet with certainty, gravity and promptness the demands that are made upon them by rich and poor alike. Technicalities, as I see them, are the only defense of the practicing attorney against the ignorant judge whose election in this country the bar has done nothing to prevent.

All three professions are engaged with the welfare of the human biped; the one with his social relations, the second with his physical relations, and the third with the things that stimulate him spiritually; the one with making his life endurable, the other with making his life possible, and the aim of the last is to give him mental comfort and peace.

But the legal profession and the theological profession are scientifically behind the medical profession. Either may entertain society and itself with more mental gymnastics, more intellectual pyrotechnics; the molecules of its gray matter may even more easily and readily assume the relation which results in what is called cerebration; but their accumulation of information, their real scientific assets are distinctly less in quantity and quality than those which confessedly belong to medicine. Why is this? The answer is but a restatement of the axiom that to retain real intellectual life, to be able to search for knowledge, to dig into the foundations of the earth for it, to grind rocks to their atoms for it, to tear life to pieces to its very omeban protoplasm for it, to follow Truth to her hiding places, to find her and hold her—all this, now, as of old, needs a mind untrammeled, a brain unshackled, needs intellectual freedom.

The medical profession has it, law and religion have it not. Right here both law and religion stumble and fall, not from any mental or moral obliquity, but because they can go no farther. The lawyer stands tied to a judge, the judge to a precedent; the minister to a creed or a theory that mayhap was evolved from the mind of a monk starving because of a religious fanaticism in a musty and reeking cell. There stands the eternal confrontment of both of these professions. It is their impassible barrier—Truth is what somebody says it is. There is no appeal, no re-examination, no further inquiry, no scalpel, no microscope, no post-mortem.

Law shades its opinions in ways that would put to shame the oracle at Delphi. In this way, quackery in all its forms finds aid enough to live outside

the bounds of its real limitations. Lawyers have it within their power to give us an officer within the National cabinet, for the conservation of the health of all the people. National health matters, in this great country of ours, are merely an appendage of the Treasury Department at Washington; while hog cholera has an officer to look after it in the President's cabinet. Law gives no comfort except for money. Law has no legal clinics, no hospitals, no temples over which it has inscribed: "Come without money and without price and find justice"; no cities of refuge where the ignorant, the down-trodden, the foreigner, the unprotected woman, the homeless child, will be given the benefits of its protection without money. Law has never attempted to equalize the great injustices of life. Law has never read the word "altruism" into its statutes. Law, in one supreme moment of glorious vision, said that all men are born free and equal, and then immediately proceeded to sell them from the market-place to the highest bidder. Both law and religion have vivisected human beings in order to destroy their opinions. Medicine vivisects "in order to make them live."

CLINTON COUNTY

The regular meeting of the Clinton County Medical Society was held in the City Hall, at Trenton, Tuesday, August 9, 1910. The meeting was called to order by the president, Dr. J. G. Vogt, and the following members were present: Drs. Bechtold, Wilcox, Vernon, Drake, Gordon, J. W. DuComb, Roane, Rienhard, Carter, Vogt and Klutho.

The minutes of the previous meeting were read and accepted. Owing to the late arrival of most of the members the regular order of business was curtailed. Dr. A. E. Meisenbach from St. Louis, who kindly responded to an invitation to be present at our meeting, showed some very interesting pathologic specimens, consisting of kidneys, gall-bladders and uterus, giving history and data of each, then followed discussions with a number of questions which the doctor answered, gave the society two hours good, solid and instructive entertainment. Drs. Roane and Vogt, our delegates to the State convention made their report. The secretary was then instructed to co-operate with Dr. J. J. Moroney, member of the medico-legal committee, to ascertain the attitude of the candidates now running for office as representatives for our district in regard to certain medical legislation and report the result to each and every member of the society before the primary. A vote of thanks was given to both Dr. E. A. Meisenbach and Mrs. J. G. Vogt for their entertainment of the society. The next meeting will be held in Shattuc on the second Tuesday in November, 1910.

JOHN C. KLUTHO, Secretary.

CRAWFORD COUNTY.

The regular bi-monthly meeting of the Crawford County Medical Society was held at the Carnegie Library, Robinson, Thursday, September 15, at 1:30 p. m. Program: "Cancer of the Uterus," Dr. Geo. C. Kasdorf; paper, Dr. J. W. Kirk.

A. LYMAN LOWE, Secretary.

JACKSON COUNTY

The third quarterly meeting of the Jackson County Medical Society was held in the parlors of the Jackson Club, at Murphysboro, Sept. 15, 1910. Present Drs. McAnally, Wayman, Molz, Carter, Essick, Tweedy, Barrow, Horstman, Orsmby. Visitors: Dr. W. W. House, Oraville, Dr. John Zahorsky, St. Louis, Mo.

At this meeting resolutions were presented by Dr. Molz, voted upon and carried, that the meetings be changed from quarterly to monthly. Each succeeding meeting to be announced at the sessions.

Program: Dr. John Zahorsky of St. Louis held a pediatric clinic. A case of "Psoas Abscess" was presented by Dr. McAnally. A case of "Ascites" was presented by Dr. Molz. Dr. Zahorsky read a very able paper entitled, "Urinary Infections of Childhood."

A rising vote of thanks was tendered Dr. Zahorsky for his courtesy and the secretary was instructed to reimburse Dr. Zahorsky in full for his expenditures of this trip. Adjourned. RAY B. ESSICK, Secretary-Treasurer.

LAKE COUNTY.

The following is a report of the recent meeting of the Lake County Medical Society.

The meeting of the Lake County Medical Society was held at the Masonic Hall, Wauconda, Ill., Sept. 20, 1910. The meeting was presided over by President Martin E. Fuller. The secretary's report was read and approved. Dr. R. C. McCormick of Wauconda was then elected a member of the society, after having been passed on by the board of censors. The following program was then carried out:

"Differential Diagnosis of Pelvic Diseases," Martin E. Fuller. Discussion of same by Drs. Gourley, Foley, Bouton, Wiechelt, Shering, Gavin, Ludwig and Wells. "What Shall We Do in the Home to Have Our Orders Carried Out?" Dr. M. J. Kalowsky. Discussed by Drs. Holm, Bouton, Fuller, Shearer, McCormick and Ludwig. "Remuneration," Dr. C. V. Arthur Wiechelt. Discussed by Drs. Watterson and Gavin. Address of welcome by president of the village board by R. C. Kent, was responded to by the secretary of the society.

Vote of thanks was then extended to Dr. Fuller for his excellent entertainment of the day, when he had planned hunting, fishing, rowing and basball for the entire day's outing for members of the society, which was taken advantage of by a large number of the members. The society then adjourned to the dining-room in the Woodman Hall, where a nice chicken supper was served by the ladies of the church and was the treat of Dr. Fuller, who, following the repast, was voted a jolly good fellow. Those present were: Drs. Churchill, Martin, Galloway, Bellows, Fuller, Taylor, Turner, Holm, Bouton, McCormick, Kalowsky, Gourley, Foley, Young, Gavin, Ludwig, Niles, Jolley, Wiechelt, Wells, Sherding, Shearer, Best, Golding, Richardson, Sowles, Hughes and Messrs. Graham, Kent and Carr. W. H. WATTERSON, Secretary.

MADISON COUNTY

The Madison County Medical Society, met in regular session September 2 in the rooms of the Edwardsville Commercial Club, with President G. Taphorn in the chair. Members present: Drs. Smith, Ihne, Wilkinson, Robinson, Zoller, Barnsback, Taphorn, Sutter, J. H. Fiegenbaum, Cook, Oliver, Sims, Hirsch, Threadgill, Dorr, Schreifels, Harrison, Wahl, Brown, Burroughs, Siegel, King, Yerkes, Binney, Foulds, Hastings, Kirchner, Armbruster and E. W. Fiegenbaum. Visitors: Dr. C. M. Riley of Alton and Dr. Hugo C. H. Schroeder of Granite City.

Several applications for membership were received and Drs. Christofer Theodoroff, Hugo C. H. Schroeder of Granite City and C. M. Riley of Alton were elected without dissenting vote. Other applications were held by the Board of Censors to report at our next meeting.

Dr. Siegel, chairman of committee on state delegate, reported the following:

Resolved: That the following shall be added to Section 6, Chapter 3, of our By-Laws: "When the delegate and alternate are both absent at a state meeting, the members of this society who are present shall elect one of their number to represent this society as delegate."

Report adopted and resolution laid over until the next regular meeting.

The society endorsed the publication of "The Madison County Doctor" and ordered it to be continued. On motion of Dr. Smith, the society elected Dr. E. W. Fiegenbaum as its member of the legislative committee.

President Taphorn then delivered his annual address on the subject, "Liability of the General Practitioner in Fracture Cases," a very interesting paper and one that brought out a lively discussion, ably led by Dr. Siegel of Collinsville.

Dr. Ihne, of Fosterburg, announced the death of Flora Clement Everett, wife of Dr. W. W. Everett, of Highland, and mother of Dr. E. A. Everett, of Alhambra. A committee consisting of Drs. Ihne and Sims presented suitable resolutions of sympathy and condolence, which were adopted, and the secretary was ordered to send copies to the respective members.

Several other matters of vital interest to the welfare of the society were referred to the Board of Censors who were requested to investigate and report at our next meeting.

Adjourned to meet in Alton on the first Friday in December.

E. W. FIEGENBAUM, Secretary.

The following are the officers of the Madison County Medical Society: President, Dr. G. Taphorn, Alton; vice-president, Dr. W. H. C. Smith, Godfrey; secretary, Dr. E. W. Fiegenbaum, Edwardsville; treasurer, Dr. J. H. Fiegenbaum, Alton; state delegate, Dr. T. L. Foulds, Alton; member medico-legal committee, Dr. J. M. Pfeiffenberger, Alton. Board of censors: Dr. S. T. Robinson, Edwardsville; Dr. W. H. C. Smith, Godfrey; Dr. W. W. Everett, Highland.

June 14 was a red letter day in the history of this society. Invitations had been sent to every member and thirty-one responded by accepting the generous hospitality of our president, Dr. G. Taphorn of Alton. Our host gave us an excellent dinner at the Illini Hotel in Alton, after which the steamer "Alton" was taken for an excursion up the river. At Piasa we were given an hour for the inspection of the Chautaqua grounds, and then proceeded up the mouth of the Illinois River. Here the return journey began and we arrived at Alton a little after five o'clock. It was a day of recreation and was enjoyed by all that were fortunate enough to be present. It gave us all an opportunity of forming and renewing acquaintances, which will tend to the betterment of professional relations and increase the interest in our society. At the suggestion of Dr. T. P. Yerkes a vote of thanks was tendered to Dr. Taphorn for this splendid entertainment.

August 11 was another day of recreation, when the members of our society met at the beautiful country home of our vice-president, Dr. W. H. C. Smith, Beverly Farm, Godfrey. The fact that the meeting was held in an extreme corner of the county and in the midst of the busy season, prevented many of our members from attending, but those who were present had a most enjoyable outing. A bountiful lunch was served during the afternoon and at the suggestion of Dr. Ihne, of Fosterburg, a vote of thanks was tendered Dr. and Mrs. Smith for their generous hospitality. Dr. Smith conducts a school for nervous and backward children, which has met with great success.

NEWS OF THE STATE

PERSONALS.

Dr. Porter W. Hopkins, Cullom, has sailed for Europe.

Dr. Wm. J. Butler, Chicago, has returned from Europe.

Dr. and Mrs. Thos. D. Palmer have returned from Europe.

Dr. Herbert C. Jones, Decatur, has returned from Europe.

Dr. M. Altman, Springfield, has removed to Milwaukee, Wis.

Dr. G. Paull Marquis and William L. Baum, Chicago, have gone to Europe.

Dr. C. G. Farnum, of Brimfield, has located in Peoria after a period of study in Vienna.

Dr. Mortimer Frank has been appointed a member of the Chicago Public Library Board.

Dr. Edward S. Winbigler, Alexis, is reported to be seriously ill at his home with septicemia.

Dr. B. K. Shimonek has been elected director for the North American Esperanto Association.

Dr. and Mrs. A. D. Bridgman, Decatur, celebrated their golden wedding anniversary, August 31.

Dr. Julius H. Hess, Chicago, has returned from four months spent among the pediatric clinics of Europe.

Dr. Harry W. Ackerman, Rockford, has been appointed first lieutenant of the Third Regiment, Illinois National Guards.

Drs. Malford Hamm, Lay G. Burroughs, and Edgar A. Cook have been appointed township physicians at Edwardsville.

Dr. Thomas M. Leahy has passed the state civil service examination for assistant physician in the state charitable institution.

Dr. Lewis J. Linder, of East St. Louis, has returned from a year's study at Berlin and Vienna, and will resume practice in that city.

Dr. G. W. Fuller, of Peoria, has removed to Danville, and announces that he will devote his time particularly to the practice of surgery.

Lieutenant-Colonel Henry Richings, Rockford, surgeon of the Third Brigade, Illinois National Guard, has been placed on the retired list.

Dr. Anthony G. Whittman, Blue Island, has passed the civil service examination for assistant physician in the state charitable institution.

Dr. H. G. Langworthy, of Dubuque, Iowa, well known to the physicians of Northwest Illinois, has fitted up an infirmary for the treatment of the diseases of the eye, ear, nose and throat.

NEWS.

—H. V. Mellinger, M.D., of Chicago, has opened an office at 100 State Street, and changed his residence to 3218 Fullerton Avenue.

—Dr. Effie L. Lobdell and Dr. Jennie B. Clark, of Chicago, have returned from an extensive trip in Europe, visiting hospitals and clinics.

—The American Medical Missionary College of Battle Creek and Chicago has been merged with the College of Physicians and Surgeons, Chicago, the Medical Department of the University of Illinois.

—Dr. A. A. Knapp, formerly of Brimfield, has returned from a year's study in Vienna and located at Peoria. The partnership existing between Drs. Knapp and Farnum, at Brimfield, will be continued at Peoria.

—Dr. J. M. Rainey, Chicago, was exonerated by a coroner's jury on the plea of a self defence for killing Louen V. Atkins, a former partner in a fake medicine concern in a quarrel over a check claimed by both.

—Dr. A. J. Goodwin, of Bradley, was burning up the road with his automobile when the machine turned turtle. The Doctor sprained his wrist and received a scalp wound, and a companion, J. T. Sandstrom, was badly bruised.

—Dr. William Hecker, of Watseka, a graduate of Northwestern University Medical School, 1902, has been arrested on the charge of murdering his wife, by drowning in Fox Lake, Wisconsin, August 29. Dr. Hecker denies the charge.

—Plans for the Nelson Morris Memorial Institute of Medical Research, opposite the Michael Reese Hospital, have been completed and the work will begin in a few days. The building will be 100 by 96 feet, and four stories in height.

—Dr. Haldane Clemenson, Chicago, is said to have been sentenced to life imprisonment September 14 by Judge McSurely, for the murder of his wife. Attorney Burres will take the case to the State Supreme Court in October, on a bill of exceptions.

—The Chicago Department of Health, in a recent bulletin, threatened to begin suits against physicians who do not report cases of typhoid fever promptly. Several cases were found due to lack of proper precautions taken in previous unreported cases.

—George W. Patton, Evanston, has donated $500,000 to the Evanston Hospital Association. The gift creates the "Agnes and Louisa Patton Fund" and is to make up a part of the endowment fund of the institution only the income of which can be used.

—The formal opening of the Bennett Medical College as the Medical Department of Loyola University occurred at the new building, Ada and Fulton Streets, September 21. The college under its new auspices is a consolidation of the Bennett and Illinois Medical Colleges.

—Anesthesia claimed three victims in Chicago within three days, in August. Two deaths occurred in hospitals and the third in a dentist's office. In the latter case the patient was anesthetized by a physician twice with chloroform within a short time, for the extraction of teeth.

—The charges of graft made by the midwives against the attorneys of the State Board of Health are said to have caused a threat to sue one L. H. Rogers for slander. The latter thereupon offered to pay the cost of filing the suit and to give $100 toward the employment of an attorney.

—Drs. Arthur R. Adams, John W. Hermetet, S. Frank Russell and Arthur K. Drake, have been appointed by the Board of Education of

Macomb to institute the medical inspection of the school children. On account of the financial condition of the city, the work will be done by these physicians gratuitously.

—Northwestern University announces that the requirements for admission to its medical school hereafter will be two years in college. Under the present conditions students registering for the medical department are required to show only one year of college work. The new plan is expected to go into effect next year.

—The Francis E. Willard Memorial Hospital has purchased a lot 48 by 125 feet, on Lincoln Street, adjoining the present hospital. The lot is improved with a two-flat building, which will be remodeled and used for the nurses, and will accommodate thirty. It is to be known as the Hobbs Home, in honor of Mrs. J. B. Hobbs, the recording secretary.

—The work of erection of the Iroquois Memorial Emergency Hospital at 87 Market Street, Chicago, has been commenced, and it is expected that the relief station will be ready to receive patients about Jan. 1, 1911. The cost of the building is estimated at $30,000. On its completion it will be turned over to the city and will be operated by the Department of Health.

—A plaster cast model of the new Cook County Hospital, for which $3,000,000 has been appropriated, shows the twelve proposed new structures, six medical buildings, two surgical buildings, one administration building, a detention building, a pathologic building and a morgue. Among the features of the plans submitted by the committee are roof gardens on the ward buildings and out door camps for tuberculosis patients.

—The *University of Chicago Magazine* for July contains an obituary of Dr. Howard T. Ricketts and an article in appreciation by Dr. Ludvig Hektoen. Dr. Hektoen says that important results in the battle against infections will follow the work of Dr. Ricketts, who died of typhus fever in Mexico in May, and he believes that the publication of the typhus researches of Dr. Ricketts and Mr. Wilder in their final form will settle the moot question regarding the disease.

—At a meeting held September 14, in Hull House Theatre, Chicago, the Chicago Health League, an organization to join all forces of the city, individual and municipal, in a co-operative effort for better sanitary living conditions, was formed. Dr. H. Cohen presided, the sanction of the department of health was given to the enterprise, and Health Commissioner Evans stated that an organization embodying all the functions of the numerous associations would tend to make more perfect sanitary conditions.

—Orthodox Jews raised a sum estimated at $10,000 September 11, at the ground breaking ceremony for the establishment of the Maimonides Kosher Hospital, at South California and Ogden Avenues, Chicago. The chief privileges sold were turning the first clod of earth, placing the name on the golden scroll, and burning the mortgage. The building is to be six stories high, and will cost about $175,000 and will accommodate about

175 patients, 75 of whom will be free patients. The first wing of the hospital is expected to be completed in less than a year.

—The fifteenth annual meeting of the Illinois State Conference of Charities and Correction will be held in Galesbury, October 22 to 25, inclusive. An elaborate program has been arranged to cover the field of activities of this organization. The subject of "Tuberculosis and What Illinois Can Do In The Battle Against It," will be presented by Dr. Woods Hutchinson, of New York. Mr. C. B. Ball, chief sanitary inspector of Chicago, will present a paper on "Bad-Housing, and Its Relation to Tuberculosis." Dr. Caroline Hedger, of Chicago, will speak on "Open Air Schools." Citizens of Galesburg have made elaborate arrangements for the entertainment of the visiting delegates.

—Announcement has been made of an invitation to the surgeons of North America, who are interested in clinical surgery, to visit the clinics of the leading surgeons of Chicago, during the two weeks, November 7 to 19, 1910. The various medical societies of Chicago will co-operate and have arranged for meetings during the two weeks, at which a number of the leading American and European surgeons will be present. Headquarters for this meeting will be maintained at the Hotel LaSalle, Madison and LaSalle Streets, where visiting surgeons will register on their arrival and receive cards of admission to the clinics and society meetings. At these headquarters will be bulletined daily the clinics, demonstrations, and other special attractions for the succeeding day. This will undoubtedly be a meeting of very great interest and full of instruction to the visitors. It will be participated in by the leading surgeons of the city, who have arranged to have their clinics at the various leading hospitals of the city.

PUBLIC HEALTH.

—The Chicago Woman's Club have called attention to the laxity in enforcing the ordinance requiring physicians and midwives to report births within thirty days, and suggest that the health department should enforce the law in this respect. One of the daily papers commenting on this action says that only vigorous enforcement of the ordinance and application of penalties for neglect to comply without discrimination will bring about a needed improvement in Chicago's vital statistics.

—Improved methods of sputum examination have been adopted recently in the Municipal Laboratory, Chicago. Sputum shakers of the Boston Board of Health type have been installed and the use of alkaline sodium hypochlorite as digestant has been introduced, resulting in the increase in the delicacy of the test and augmentation of the capacity of the laboratory. During the four months prior to the installation tubercular bacilli were found in 17.5 per cent. of the 1,017 specimens examined, and in three months following the installation 27.1 per cent. of tubercular bacilli, in 506 specimens of sputum.

—A few weeks ago Dr. George Thilo called the attention of the Department to the prevalence of lead poisoning in his neighborhood.

Since that time we have investigated carbonated waters with the following results:

Samples of carbonated waters examined (including products marketed as seltzer water, ginger ale, pops or sodas of various colors), 66.

Samples containing lead, 18.

Amount of lead present:

In 3 samples, ¼ gr. per gallon; in 3 samples, 1/10 gr. per gallon; in 8 samples, 1/20 gr. per gallon; in 4 samples, 1/40 gr. per gallon.

Factories investigated, 30.

Factories marketing lead-containing waters, 8.

Factories ordered closed, 6.

Factories ordered to improve equipment or methods, 2.

The worst offenders were the "pops" sold in bottles stoppered by a stopper with a wire loop. This bottle is opened by pushing the rubber stopper in by the loop. From 50 to 90 per cent. of these stoppers are of lead. The manufacturers have since agreed to cease selling lead stoppers in Chicago, and the pop makers have been instructed to discontinue their use.

Another way in which lead gets into bottle-charged water is from lead shot, which is used in washing the bottles. The manufacturers have been so instructed, and many of them have agreed to discontinue the use of lead shot for bottle washing and to substitute iron or steel shot for such purpose.

All lead pipes in carbonating and soda water apparatus have been ordered out.

We are now testing the methods of soldering carbonators to see whether carbonated waters can pick up lead from such sources.—*From Bulletin, Chicago Department of Health.*

—One day this week a Chicago housewife decided that she would find out the bacterial count of ice cream made in the home kitchen. She took market milk regularly left by the regular milk man. The milk was delivered at 4 a. m. After breakfast, the house work being finished, she and the Swedish housemaid went into the kitchen, made the mixtures and heated them. They were then frozen in a small freezer costing $1.25. At 3 o'clock in the afternoon a sample of the cream was sent to the Health Department for analysis; at 4:15 o'clock bacterial samples were taken and the cream was sent to another laboratory where check samples were taken at 4:30 o'clock. The counts were 260 and 190 per c.c. Compare this with the average of market samples—6,074,600 per c.c. The small milk dealer, the small ice cream maker or the neighborhood baker whose places are very clean and who make or handle their own product themselves or under their immediate supervision, will be able to make a cleaner product than is possible in the larger plants with hired workmen unless the standards of cleanliness of such plants are very high. There is a great deal of very clean ice cream being sold in Chicago, also much that is not clean. The proper course for the housewife to follow is to freeze cream in the home unless she knows that the place where she buys ice cream is clean, that the factory in which it is made is clean and that the product itself is clean. The proper course for the dealer to follow is to make his place very clean and to invite public inspection, thus making it easy to determine whether the ice cream is clean. He should advertise on his windows and elsewhere every proof that he maintains very clean premises, and that the cream which he sells is clean and wholesome. We have observed several such signs on windows of stores where ice cream is sold. The idea is excellent.—*From Bulletin, Chicago Department of Health.*

—Public drinking cups are dangerous; they are recognized by all sanitarians as excellent mediums for transmitting the germs of disease. Especially is this true in public and parochial schools where a large number of children are compelled to use the same cup. Statistics tell us that about one person out of sixty has tuberculosis; and among school children there are always those who have some of the communicable diseases in light form and these are communicated, without doubt, by the use of the common cup. So fully is this now understood that several states of the Union have passed laws abolishing the public drinking cup, and compelling railroads and public carriers to supply individual cups. The use of individual cups has also been advocated in public and parochial schools. It is doubtful, however, whether this would prove practicable. The better and safer plan, no doubt, would be the installation of what is known as "bubbling" cups with the water flowing over the rims all the time. Such cups would be safe and sanitary, and it is doubtful whether it would involve very much more waste of water than the present dangerous common cup. A cup which had been used in a high school for several months without having been washed was lined inside with a thick brownish deposit. How often have you seen drinking cups in similar condition. Under the microscope this deposit proved to be composed of particles of mud, thousands of bits of dead skin, and millions of bacteria. Some of this sediment was injected under the skin of a healthy guinea pig and forty hours later the pig died. An examination afterward showed that pneumonia germs had killed the pig. A second guinea pig was inoculated with some of the sediment from the same cup and developed tuberculosis. Careful inquiry showed that several pupils in this school from which the cup was taken were then suffering from consumption. The people of Chicago should start an agitation asking the school board to install the "bubbling" cups in all Chicago public schools. If this were done it would be a long step toward the prevention of disease.—*From Bulletin, Chicago Department of Health.*

HEALTHGRAMS.

—Our one first duty—to keep well.

—It is easier to retain than to regain health.

—Good food, good drink and good air for good thinking and good working.

—Food and air, to make heat; water to circulate the material so that each tiny cell gets its proportion; exercise (work) to shake out the ashes—should be the motto of each one who wishes to be well and happy.

—Bathe the body daily—an active and clean skin relieves the lungs and kidneys of much work.

—Personal cleanliness is more than a fad or a luxury—it means health and life.

—Cleanliness costs little—sickness costs much.

—Build your reputation for civic pride in your back yard.

—We spend millions for tobacco—have we "money to burn?"—From *Bulletin,* Chicago Department of Health.

—Wash your hands! Wash them often! When we remember that every bit of food we eat is handled by human hands, we can better understand how important it is that hands should be clean. Some dirty hands are clean and some clean hands are dirty and dangerously dirty. This means that some kinds of dirt are harmless and others are not. Most often it is the invisible dirt that is dangerous to both life and health. The farmer's hands may be grimy and dirty from the soil of the farm; the plasterer's hands may be covered with lime and mortar; but in neither case would the dirt be very dangerous. The germs of disease are everywhere. It is believed by sanitarians that unclean hands spread more typhoid than is carried by flies. Thousands of cases of this terrible disease have been traced directly to cooks, cooks' helpers, bakers, dairy people and those who have handled or prepared food with unclean hands—hands that were polluted with the germs of typhoid. Scientists tell us that if a dozen men and women only dip their hands into a basin of water upon examination it will be found to be swarming with colon bacilli. And these average hands are those that handle our bread, our meat, our fruit, our pastry, and, in fact, everything we eat and drink. Many persons continue to be carriers of typhoid for years after they have themselves recovered from the disease. A noted physician tells us of a case where a mother had successively infected thirteen members of her own family with typhoid after her own recovery, and that for thirty-one years she was still a carrier of the disease. And then he adds: "Plain common sense can do nothing but trace it through her dirty hands to the food she cooked and served." It has been demonstrated that 78 germs of typhoid placed in fresh milk became 60,000 in twenty-four hours, 10,300,000 in forty-eight hours, and 480,000,000 in seven days. This shows us how easy it is to infect milk or food of almost any kind with dirty hands. So, too, we can and do poison our own food when we fail to thoroughly wash our hands before each meal. And because this is true, we should wash our hands OFTEN and wash them CLEAN.—*From Bulletin, Chicago Department of Health.*

SCHOOLGRAMS.

—Let the first lesson be: How to keep well.

—You'll be brighter, learn more and keep in better health if your teacher will keep the windows of the school room open. Bad air makes a sluggish brain.

—"Do unto others as you would have others do unto you"—meaning: Don't carry disease germs to school and cause sickness and perhaps death among your playmates. If you have a contagious disease at home keep entirely away from all other children. Stay at home if you have a sore throat.

—"Skidoo" from the boy or girl with "a little sore throat."

—A "little sore throat" in one little child may cause a big lot of trouble for many other children. Many "little sore throats" are in reality diphtheria.

—Wash the drinking cup thoroughly before putting it to your mouth. The child who used it just before you may have left the germs of disease on it. Wash the germs off.

—Keep that pencil out of your mouth—it may have scarlet fever, diphtheria or typhoid fever germs on it.

—Swapping gum, swapping apples and swapping candy are about the dirtiest things—and the most dangerous things—that a child can do. Don't be that dirty.

—Keep your hands clean. Soap is your good friend—dirt is your worst enemy.

—Eat very little candy—treat your stomach well and you'll live longer.

—Never buy candy or fruit at an open stand on the street. Flies have left all kinds of dirt on it and dirt from the streets has been blown upon it.

—When you play, play out of doors—but never play in dusty places.

—Don't run to school—especially just after eating. Start in time so that you will not have to run.

—Be well and you'll be happy—even in school.—*From Bulletin, Chicago Department of Health.*

—The season for the last few months has been particularly favorable for the spread of typhoid fever infection in the rural districts from which the food supplies of Chicago come. The recently somewhat increased rate of prevalence of typhoid in Chicago is due, certainly to some extent, to infection introduced by foods and persons from these rural districts. Of the foods brought in from the country milk is the one most liable to cause infection, because in milk typhoid germs multiply at a very rapid rate. If a very small particle of matter containing only one or two typhoid germs finds its way from the faulty privy through dirty hands, flies, or the polluted well or stream, into the milk can at the dairy farm, the one or two germs may number millions before that milk reaches the consumer. At this time it is particularly desirable to use no milk that has not been properly pasteurized. If the householder has the slightest doubt as to the proper pasteurization of milk at the dairy, he should make sure by pasteurizing the milk at home. That milk is from tuberculin tested cows is no indication that the milk is free from the germs of typhoid fever.—*From Bulletin, Chicago Department of Health.*

MARRIAGES

THOMAS P. LYNAM, M.D., to Miss Mary Ellen Boyle, both of Chicago, September 14.

FREMONT C. KNIGHT, M.D., Waukegan, Ill., to Miss Iva Fisher, of Chicago, September 6.

DEATHS.

ROBERT EMERY, M.D., Victoria College, Toronto, 1857; one of the oldest practitioners of Peoria; died suddenly in Dunlap, Ill., August 24, aged 82.

CHARLES T. BUCKHOLTZ, M.D., Homeopathic Medical College of Missouri, St. Louis, 1874; died at his home near Murphysboro, August 30, from angina pectoris, aged 69.

WILLIAM JEFFERSON EASLEY (license, years of practice, Ill.); formerly of Raymond; died at the home of his daughter in Decatur, August 7, from senile debility, aged 82.

LEVI SPENCER WILCOX, M.D., Long Island College Hospital, Brooklyn, N. Y., 1873; twice mayor of Champaign; died at the California Hospital, Los Angeles, August 5, aged 63.

JOSEPH J. TREMBLAY, M.D., College of Physicians and Surgeons, Chicago, 1895; a member of the American Medical Association; died suddenly at his home in Moline, August 23, from heart disease, aged 48.

HERBERT MARCUS GOODMAN, M.D., Rush Medical College, 1909; an intern at Cook County Hospital; died at the home of his father in Chicago, August 19, after an operation for carcinoma of the pharynx, aged 27.

MARTHA A. RICHARDSON, M.D., College of Physicians and Surgeons, Keokuk, Iowa, 1896; of Canton; a member of the American Medical Association; died in the Proctor Hospital, Peoria, August 25, from chronic nephritis, aged 39.

SAMUEL SCOTT SALISBURY, M.D., Western Reserve University, Cleveland, 1854; a member of the Illinois State Medical Society; for nearly half a century a practitioner of Tolono; died at his home, August 22, from senile debility, aged 81.

FOSTER FRUTCHEY, M.D., Medico-Chirurgical College of Philadelphia, 1891; a member of the Illinois State Medical Society; professor of operative surgery and applied anatomy in Illinois Medical College; died at his home in Chicago, August 28, from meningitis, aged 44.

FRANK FLEURY (years of practice, Ill., 1887); of Springfield; from 1881 to 1885 secretary of the State Board of Pharmacy; secretary of the Illinois State Pharmaceutical Association in 1880; died at the home of his daughter in Springfield, August 29, from uremia, aged 68.

ERIC A. DAVIDSON, M.D., Bennett College of Eclectic Medicine and Surgery, Chicago, 1898; Rush Medical College, Chicago, 1901; a member of the Illinois State Medical Society; professor of medicine in Bennett College of Eclectic Medicine and Surgery, Chicago; died at the home of his brother in Berkeley, Cal., July 30, aged 51.

JAMES NEVINS HYDE, M.D., University of Pennsylvania, Philadelphia, 1869; a member of the American Medical Association; twice president of the Chicago Dermatological Association; second president of the American Dermatological Association; and an honorary, active or corresponding member of the leading dermatologic associations of Europe; assistant surgeon in the navy for two years during the Civil War, and for three years thereafter; for thirty-one years professor of skin, venereal and

genito-urinary diseases in Rush Medical College and secretary of the council administration and faculty of the institution; professorial lecturer on dermatology at the University of Chicago since 1902; a notable contributor to the literature of dermatology; and the author of a standard text-book which is already in its eighth edition; dermatologist to the presbyterian, Augustana, and Michael Reese hospitals, and the Chicago Orphan Asylum; a member of the Mayflower Society, the Society of Colonial Wars, and the Sons of the American Revolution; one of the

JAMES NEVINS HYDE, M.D.

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most prominent specialists on skin and venereal diseases of America; died suddenly September 6, at his summer home, Prout's Neck, Maine, aged 70.

Dr. Hyde was one of the best known American medical men. Not only was he highly regarded by his coworkers in his chosen field of professional work on account of that work, but because of his interest in medical affairs and the medical profession generally. All who knew him loved him for his liberality and for his kindness toward all who approached him, young men especially.

Book Notices.

SURGICAL AFTER-TREATMENT. By L. R. G. Crandon, A.M., M.D., Assistant in Surgery at Harvard Medical School. Octavo of 803 pages, with 265 original illustrations. Philadelphia and London: W. B. Saunders Company, 1910. Cloth, $6 net; half morocco, $7.50 net.

Dr. Crandon has brought to the consideration of the after treatment of surgical cases that sixth common sense which is too often neglected in the practice of surgery. He does not claim infallibility, and makes the following suggestion in his preface, which will be appreciated by every thoughtful practitioner. Such frankness will attract attention to this work and we have no doubt will make it popular wherever it is read.

"Every procedure herein advised has stood the test of practice and will safely do for the reader until, from his own experience, he develops his own methods. The fact that each surgeon eventually grows into a technic peculiar to himself, and that many differing ways are successful, should make us liberal in spirit and constantly alert for new truth. No surgical life is so brief but that it has seen new methods appear, vaunted as perfect, pursued for a time, only to fade away."

DISEASES OF THE STOMACH AND INTESTINES. By Robert Coleman Kemp, M.D., Professor of Gastro-Intestinal Diseases, New York School of Clinical Medicine. Octavo of 766 pages, with 279 illustrations. Philadelphia and London: W. B. Saunders Company, 1910. Cloth, $6 net; half morocco, $7.50 net.

Dr. Kent's volume, which is dedicated to Wm. H. Thomson, the grand old man of clinical medicine in the city of New York, is a volume of which Dr. Kemp may well be proud. He has taken full advantage of modern employment of photography to demonstrate methods, their diagnosis and treatment. Visceral displacements, which have recently assumed their important position, are especially described, and their symptoms, diagnosis and treatment, notably by mechanical methods, are fully considered. The examination of the stomach by the Roentgen rays and radium trans-illumination is considered, as well as trans-illumination of the intestines and electric transposition of the lower bowels. The work is well worthy of place in the library of every practitioner.

GYNECOLOGICAL DIAGNOSIS. By Walter L. Burrage, A.M., M.D. (Harvard), Fellow of the American Gynecological Society; Member of the Obstetrical Society of Boston; Consulting Gynecologist to St. Elizabeth's Hospital; Formerly Visiting Gynecologist to St. Elizabeth's and Carney Hospitals; Electro-Therapeutist and Surgeon to Out-Patients, Free Hospital for Women; Clinical Instructor in Gynecology, Harvard University, and Instructor in Operative Gynecology in the Boston Polyclinic. Two hundred and seven text illustrations. New York and London: D. Appleton & Company, 1910.

Dr. Burrage's work, which is constructed somewhat on the plan of the lamented Dr. Winter, will be found a welcome aid by many practitioners in their work. It is distinguished by its clearness and completeness. The photographs and drawings have been a help in use of illustrating the subject of the text, and it will be found a valuable guide in the diagnosis and treatment of the diseases which it treats.

DUODENAL ULCER. By B. G. A. Moynihan, M.S. (London), F.R.C.S., Senior Assistant Surgeon at Leeds General Infirmary, England. Octavo of 379 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1910. Cloth, $4 net; half morocco, $5.50 net.

Mr. Moynihan has brought to the consideration of duodenal ulcer all the knowledge and skill which he has used to such great advantage in the consideration of other diseases of the digestive tract. No one without a large operative

experience could compile such a work, and it is well for us to know that most of the diseases herein described have been for ages attributed to functional diseases of the stomach and intestines. He not only advises the best surgical means for curing the disease, but suggests that surgery will be of benefit to the patient and practitioner, by showing the best means of treatment medically.

HOOKWORM DISEASE: Etiology, Pathology, Diagnosis, Prognosis, Prophylaxis and Treatment. By George Dock, A.M., M.D., Professor of the Theory and Practice of Medicine, Medical Department Tulane University of Louisana, New Orleans, and Charles C. Bass, M.D., Instructor of Clinical Microscopy and Clinical Medicine, Medical Department Tulane University of Louisana, New Orleans. Illustrated with 49 special engravings and colored plate. St. Louis: C. V. Mosby Company, 1910.

Drs. Dock and Bass have made of this disease a book of surpassing interest, the reading of which has all the interest of a novel. In the preface to the work the following remarks are made which we deem so important that we give them in full:

"No more striking example of the transitory state of medical knowledge can be advanced than the proof brought within the last few years, not only that hookworms exist as human parasites in a large part of the country, but that they may with reason be looked upon as among the most important causes of diseases of the South in extent, in destruction of life, and in leading to physical and mental degeneration. The fact that the parasites in the United States belong to a new species is a most important one and very suggestive in its bearing on medical zoology. In many parts of Europe hookworm disease is one of the most important economic problems. Immense labor and expense have been devoted to the measures for its repression in Belgium and Germany especially, where it seriously affects the mining industry.

"The study of hookworm disease in America has shown the heavy load that endemic disease lays upon the country. Largely due to it, a region that should be most fertile lies relatively uncultivated; a population derived from the best colonizing blood ekes out a miserable existence and is doomed to extinction unless it is soon relieved of its infection. Thanks to the painstaking labors of zoologists and physicians much has been learned of the disease and its parasite. Physicians and hygienists have realized that the evil, preventable as it is, must stop, and medical men, administrative officers and private philanthropists are now working actively to that end."